



DRAFT PERMIT

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STATE OF ARIZONA
TEMPORARY AQUIFER PROTECTION PERMIT NO. P- 106360
PLACE ID 1579, LTF 61845
SIGNIFICANT AMENDMENT

1.0 AUTHORIZATION

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2 and 3, Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Articles 1 and 2, A. A. C. Title 18, Chapter 11, Article 4 and amendments thereto, and the conditions set forth in this permit, the Arizona Department of Environmental Quality (ADEQ) hereby authorizes Florence Copper Inc. to operate the Florence Copper Project- Pilot Test Facility Florence, Pinal County, Arizona, over groundwater of the Pinal Active Management Area, in Section 28, Range 9E, Township 4S Gila and Salt River Base Line and Meridian.

For purposes of A.A.C. R18-9-A210(E), this permit becomes effective upon the date ADEQ approves the permittee's written notification to ADEQ that all pre-operational requirements have been completed.

1. Following all the conditions of this permit including the design and operational information documented or referenced below, and
2. Such that Aquifer Water Quality Standards (AWQS) are not violated at the applicable point of compliance (POC) set forth below, or if an AWQS for a pollutant has been exceeded in an aquifer at the time of permit issuance, that no additional degradation of the aquifer relative to that pollutant, and as determined at the applicable POC, occurs as a result of the discharge from the facility.

1.1 PERMITTEE INFORMATION

Facility Name: Florence Copper Project Production Test Facility
Facility Address: Florence Copper Inc.
1575 W. Hunt Highway
Florence, AZ 85132

Permittee: Florence Copper Inc.
Permittee Address: 1575 W. Hunt Highway
Florence, AZ 85132

Facility Contact: Dan Johnson, Vice President, Environmental
Emergency Phone No.: (520) 374-3984

Latitude/Longitude: 33° 03' 1.4" N / 111° 26' 4.7" W
Legal Description: Township 4S, Range 9E, Section 28 Gila and Salt River Base Line and Meridian

1.2 AUTHORIZING SIGNATURE

Trevor Baggione, Director
Water Quality Division
Arizona Department of Environmental Quality
Signed this _____ day of _____, 2016

THIS AMENDED PERMIT SUPERCEDES ALL PREVIOUS PERMITS

2.0 SPECIFIC CONDITIONS [A.R.S. §§ 49-203(4), 49-241(A)]

2.1 Facility / Site Description [A.R.S. § 49-243(K)(8)]

The Temporary Individual Aquifer Protection Permit (APP) is for a Production Test Facility (PTF), a pilot scale test facility located on approximately 160 acres of the Arizona State Land (Mineral Lease 11-26500). The Temporary APP is to construct and operate a production test facility which shall provide sufficient data to assess and develop a full-scale in-situ mining operation.

The PTF will occupy approximately 13.8 contiguous acres and the PTF well field will occupy approximately 2.2 acres. Florence Copper Inc. proposes to construct and operate the PTF over a two-year period, estimated to include an approximate 14 month leaching phase and a 9 month mine block rinsing phase. The PTF well field will contain a total of 24 wells and consists of 4 Underground Injection Control (UIC) Class III injection wells, 9 recovery wells, 7 observation wells, and 4 multilevel sampling wells. The proposed In-Situ Copper Recovery (ISCR) process involves injecting a lixiviant (99.5% water mixed with 0.5% sulfuric acid) through injection wells into the oxide zone of the bedrock beneath the site for the purposes of dissolving copper minerals from the ore body. The estimated injection zone is between approximately 500 feet below ground surface (ft bgs) to 1,185 ft bgs. The resulting copper-bearing solution will be pumped by recovery wells to the surface where copper will be removed from the solution in a solvent extraction electro winning (SX/EW) plant. The barren solution from the SX/EW plant will be re-acidified and re-injected back into the oxide zone. Other facilities proposed for the PTF will include the SX/EW Plant, Process Water Impoundment (PWI), Runoff Pond, tank farm and other ancillary facilities.

The site includes the following permitted discharging facilities:

Table 2.1 Permitted Facilities		
Facility	Latitude	Longitude
In-Situ Area Injection and Recovery Well Block	33° 3' 1.39" N	111° 26' 4.69" W
Process Water Impoundment	33° 3' 8.67" N	111° 25' 22.18" W
Run-off Pond	33° 3' 4.66" N	111° 25' 22.6" W

Annual Registration Fee [A.R.S. § 49-242 and A.A.C. R18-14-104]

The annual registration fee for this permit is established by A.R.S. § 49-242 and is payable to ADEQ each year. The design flow is 432,000 gallons per day (gpd).

Financial Capability [A.R.S. § 49-243(N) and A.A.C. R18-9-A203]

The permittee has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The permittee shall maintain financial capability throughout the life of this permit. The estimated closure cost is \$3,946,194. The financial assurance mechanism was demonstrated through a performance surety bond in the amount of \$3,946,194(A.A.C. R18-9-A203 (C)(2)).

2.2 Best Available Demonstrated Control Technology [A.R.S. § 49-243(B) and A.A.C. R18-9-A202(A)(5)]

This permit authorizes the temporary operation of the discharging facilities listed below, pursuant to A.A.C. R18-9-A210(E). The intent of the pilot test is to demonstrate that hydraulic control of the in-situ solution can be maintained at the site in order to conduct a copper recovery process. The discharging facilities and their BADCT descriptions are also presented in Section 4.1, Table 4.1-1.

2.2.1 Engineering Design

2.2.1.1 In-Situ Area Injection and Recovery Well Block

Design, construction, testing (mechanical integrity), and operation of injection and recovery wells shall follow EPA Class III rules (40 CFR Part 146). The maximum fracture pressure shall be no greater than 0.65 pounds per square inch per foot (psi/ft) of depth. Hydraulic control shall be maintained at all times, within the pilot test facility well block, by pumping recovery wells at a rate greater than the injection rate in order to maintain a cone of depression that extends at least 500 feet from the in-situ area injection and recovery well block. The injection and extraction volumes shall be metered at the well-heads, monitored daily, and recorded. Surface water control shall be provided for the PTF injection and recovery well sites.

2.2.1.2 Process Water Impoundment

The Process Water Impoundment (PWI), a process solution pond, shall be used to evaporate neutralized solutions and contain resulting sediments. The PWI shall be located immediately north of the runoff pond which is directly north of the SX/EW plant. The PWI shall have a capacity of approximately 1.7 million cubic feet, approximately 15 to 23-feet deep, with internal and external side slopes of 2.5-feet horizontal to 1.0-foot vertical (2.5H:1V), and maintain a minimum of two (2) feet freeboard. The PWI shall be designed as a double liner system and include a leak collection and removal system (LCRS). The liner system shall consist of, from bottom to top; a compacted sub-grade (foundation) with liner bedding, 60-mil HDPE secondary liner, geonet, and 60-mil primary liner. The LCRS shall be equipped with: a sump located at the lowest elevation of the pond; a sump pump to remove accumulated liquids; and an alarm system for fluid detection.

2.2.1.3 Run-off Pond

The Runoff Pond, a non-stormwater pond, shall be located directly south of the PWI, north of the adjacent SX/EW plant, and northeast of the Pregnant Leachate Solution (PLS) and Raffinate tank secondary containment structure. The Runoff Pond shall be designed to capture direct precipitation; stormwater runoff from the roofs of on-site structures, cathode storage slab and concrete apron on the south side of the SX/EW Building; fire sprinkler water or process solutions that may enter or overflow the SX/EW Building floor sump; and any spills on or wash down from these areas. The Runoff Pond shall have a capacity of approximately 6,583 cubic feet; approximately 5-feet deep; internal and external side slopes shall be no less than 2.0-feet horizontal to 1.0-foot vertical (2.5H:1V); and pond shall maintain a minimum of two (2) feet freeboard. The Runoff Pond shall be designed with a single liner that includes an engineered compacted sub-grade and 60-mil HDPE geomembrane liner. The Runoff Pond shall incorporate a sump equipped with a pump along with fluid-level detection equipment. When fluid is detected above the level set-point the pump will transfer fluid out of the Runoff Pond to the PWI via pipeline.

2.2.2 Site-specific Characteristics

Not applicable to this permit.

2.2.3 Pre-operational Requirements

- a) All boreholes or wells, other than those approved for the PTF, located within 500-feet of the PTF well field boundary shall be plugged and abandoned per the Arizona Department of Water Resources (ADWR) rules and EPA Underground Injection Control (UIC) regulations prior to PTF operation. All boreholes or wells within a 150-foot radius of the Process Water Impoundment and Runoff Pond shall also be plugged and abandoned per the Arizona Department of Water Resources (ADWR) rules. Documentation records for the plugging and abandonment of all boreholes and wells within 500 feet of the PTF and within 150 feet of the Process Water Impoundment and

Runoff Pond shall be submitted in accordance with the Compliance Schedule in Section 3.0.

- b) All Class III injection wells shall be drilled, cased and cemented according to the requirements of the UIC permit. Prior to commencement of operation, all new Class III injection wells shall meet the mechanical integrity testing (MIT) requirements of the UIC permit.
- c) The permittee shall complete aquifer pump tests from the four outermost recovery wells located at the four corners of the PTF well field prior to injection in order to optimize knowledge of subsurface characteristics particularly within the targeted in-situ leaching zone and report in accordance with Section 2.7.4.3 and the Compliance Schedule (Section 3.0)
- d) Once the electrical conductivity (EC) probes are installed, determine ambient Bulk EC conditions, propose alert levels (ALs) and report in accordance with Section 2.7.4.7 and Compliance Schedule (Section 3.0)
- e) Inward hydraulic gradient towards the recovery wells shall be established and confirmed prior to the injection of acidified process solution into the injection wells and reported in accordance with Section 2.7.4.3 and Compliance Schedule (Section 3.0).
- f) The permittee shall establish a cone of depression by confirming that groundwater elevation at the downgradient edge of the PMA boundary is higher than groundwater elevation at the downgradient PTF observation well. The groundwater elevations will be used to compile a potentiometric surface map to be submitted to WPS as required in Section 3.0, CSI #2.
- g) The permittee shall establish ambient mine block groundwater concentrations using an ADEQ approved statistical method (see Section 2.7.4.2) to determine pre-mining concentrations at the PTF wells. Ambient groundwater concentrations for POC wells and Supplemental wells (including MW-01) shall be established in accordance with Section 2.5.3.2 and reported per the Compliance Schedule (Section 3.0).

2.2.4 Operational Requirements

A description of required inspections and operational monitoring for BADCT is included in Section 4.1, Tables 4.1-3, and 4.1-8.

The injection wells at the site are classified as Class III Injection wells by the USEPA and are permitted by EPA's UIC Program. The injection and recovery wells shall be designed to meet the mechanical integrity requirements in the UIC regulations, Code of Federal Regulations (CFR) part 144 and 146. All injection wells and recovery wells shall be designed and installed to prevent injection into the top 40 feet (the exclusion zone) of the oxide zone. The injection of the solutions shall be limited to the Oxide ore body only.

The PTF operation relies on hydraulic control of the ISCR solutions to demonstrate BADCT. Hydraulic control shall be confirmed through the use of observation wells, supplemental wells, MW-01, and POC wells. An inward hydraulic gradient shall be measured by water level elevations in recovery and observation wells. Bulk well field electrical conductivity shall be measured at all observation wells. Fluid electrical conductivity shall be measured at observation and injection wells to confirm hydraulic control. Well bore electrical conductivity shall be measured above the middle fine grained unit (MFGU) on all observation wells, supplemental wells, multi-level sampling wells and operational monitoring well MW-01. Groundwater elevations in wells completed in the Oxide shall be measured to confirm the groundwater elevation at the downgradient edge of the PTF well field is lower than the edge of the PTF well field pollutant management area boundary (i.e. BADCT cone of depression). The rates of injection and recovery shall be continuously monitored and controlled so that the total volume of solution recovered is greater than the volume of solution injected, averaged over 24 hour period. Automatic controls and alarms shall be used in the well field to ensure process upsets do not result in the loss of hydraulic control. Hydraulic control over the injected solutions shall be maintained from the time injection begins and until well abandonment is completed by the applicant and approved by the appropriate agencies and groundwater in the mine blocks meets APP closure criteria.

The injection pressure in the Class III injection wells shall be kept below the fracture pressure of the oxide ore body. A fracture gradient of 0.65 pounds per square inch per foot (psi/ft) of depth was established by field test data as being adequate to prevent hydraulic fracturing of the bedrock.

Observation wells located down-gradient of the injection wells may be temporarily converted to use as recovery wells in order to maintain hydraulic control.

2.3 Discharge Limitations [A.R.S. §§ 49-201(14), 49-243 and A.A.C. R18-9-A205(B)]

The permittee shall operate and maintain all permitted facilities listed below to prevent unauthorized discharges pursuant to A.R.S. §§ 49-201(12) resulting from failure or bypassing of BADCT pollutant control technologies including liner failure, uncontrollable leakage, overtopping (e.g., exceeding maximum storage capacity defined as a fluid level exceeding the crest elevation of a permitted impoundment), berm breaches, accidental spills, or other unauthorized discharges.

2.3.1 In-Situ Area Injection and Recovery Well Block

Hydraulic control over the injected solutions shall be maintained during the operating life of the facility. In-situ solutions shall be injected and contained within the oxide unit.

2.3.2 Process Water Impoundment

The PWI shall be used to store neutralized solutions and resulting sediments, and direct precipitation.

2.3.3 Run-off Pond

The Runoff Pond shall be used to capture direct precipitation; stormwater runoff from roofs on-site structures, cathode storage slab, and concrete apron on the south side of the SX/EW building; fire sprinkler water or process solutions that may enter or overflow the SX/EW Building floor sump; any spills or wash down from these areas; and process upset events.

2.4 Point(s) of Compliance [A.R.S. § 49-244]

The Points of Compliance (POC) are listed in Table 2.4 below. Monitoring shall be conducted at each Point of Compliance (POC) as listed in Section 4.1, Table 4.1-6 and 4.1-7.

Table 2.4 GROUNDWATER MONITORING POINTS OF COMPLIANCE						
POC #	ADWR No.	Total Depth (ft. bgs)	Latitude	Longitude	Screened Interval (ft. bgs)	Aquifer Unit
POCs for In-Situ Well Filed						
M14-GL	55-549172	859	33° 03' 4.0"N	111° 26' 15.77"W	778-838	LBFU
M15-GU	55-547813	615	33° 03' 4.04"N	111° 26' 16.40"W	554-594	LBFU
M22-O	55-555831	1,140	33° 03' 4.53"N	111° 26' 15.76"W	932-1,130	Oxide
M23-UBF	55-555824	260	33° 03' 4.51"N	111° 26' 16.50"W	210-250	UBFU
M54-LBF	TBD	650	33° 03' 7.07"N	111° 26' 9.29"W	500-640	LBFU
M54-O	TBD	1,210	33° 03' 6.91"N	111° 26' 9.22"W	660-1,200	Oxide
POCs for Impoundments						
M52-UBF	TBD	276	33° 03' 11.03"N	111° 25' 24.66"W	200-275	UBFU

Note: TBD - to be determined. The monitoring well location and construction details are proposed, pending final installation of the wells. The wells are to be installed in accordance with the Compliance Schedule, Section 3.0.

The Director may amend this permit to designate additional POCs, if information on groundwater gradients or groundwater usage indicates the need.

2.4.1 New Well Design and Installation

The permittee shall submit design specification for any other wells that may be installed or modified for ADEQ's prior review and approval. The wells shall be designed with appropriate surface seals, annular seals to prevent cross contamination, plugs above the filter pack to prevent cement grout intrusion into the filter pack and screen, and filter pack and screen size selected for the lithology of the screened interval.

All new wells shall be developed after installation and allowed to recover at least one week prior to collection of an initial groundwater sample.

2.4.1.1 Replacement Wells

In the event that a well other than a POC well should become unusable or inaccessible due to damage, a significant decrease and/or increase in water level, or any other event, the replacement well(s) shall be approved by ADEQ.

2.5 Monitoring Requirements [A.R.S. § 49-243(B) and (K)(1), A.A.C. R18-9-A206(A)]

All monitoring required in this permit shall continue for the duration of the permit, regardless of the status of the facility. Monitoring shall commence the first full monitoring period following permit effective date or at a frequency specified by the permit. All sampling, preservation and holding times shall be in accordance with currently accepted standards of professional practice. Trip blanks, equipment blanks and duplicate samples shall also be obtained, and Chain-of-Custody procedures shall be followed, in accordance with currently accepted standards of professional practice. Copies of laboratory analyses and Chain-of-Custody forms shall be maintained at the permitted facility. Upon request, these documents shall be made immediately available for review by ADEQ personnel.

2.5.1 Discharge Monitoring

Discharge monitoring shall be conducted on a one time basis at the PLS Tank, Raffinate Tank, Process Water Impoundment and Runoff Pond in accordance with Section 4.1, Table 4.1-2A, and the Compliance Schedule in Section 3.0, within 120 days of initial PTF start-up in order to allow for accurate representation of process solutions. Initial discharge monitoring of the underground workings shall be conducted at the location identified in Section 4.1, Table 4.1-2B and in accordance with Section 2.7.4.3 and the Compliance Schedule, Section 3.0. The underground workings shall be depth specific sampled before the PTF operations begin. Continued underground working discharge monitoring shall also occur during the injection phase at least sixth months into the mining phase, one month after the mining has ceased, one month after the rinsing phase, and into the closure and post closure monitoring period. Discharge Monitoring Sampling Parameters are listed in Section 4.1, Table 4.1-2C. Results of the discharge monitoring shall be submitted to the WPS within 30 days from receipt of the laboratory analytical results.

2.5.2 Facility / Operational Monitoring

Facility-specific operational monitoring requirements are listed in Section 4.1, Tables 4.1-3 and 4.1-8.

2.5.3 Groundwater Monitoring and Sampling Protocols

Static water levels shall be measured and recorded prior to sampling. Wells shall be purged of at least three borehole volumes (as calculated using the static water level) or until field parameters (pH, temperature, and conductivity) are stable, whichever represents the greater volume. If evacuation results in the well going dry, the well shall be allowed to recover to 80 percent of the original borehole volume, or for 24 hours, whichever is shorter, prior to sampling. If after 24 hours there is not sufficient water for sampling, the well shall be recorded as "dry" for the monitoring event. An explanation for reduced pumping volumes, a record of the volume pumped, and modified sampling procedures shall be reported and submitted with the Self-Monitoring Report Form (SMRF).

As an alternative method for sampling, the permittee may conduct the sampling using the low-flow purging method described in the Arizona Water Resources Center March 1995 Field Manual for Water Quality Sampling. Under this method, the well must be purged until at least two indicator parameters stabilize. Indicator parameters shall include dissolved oxygen, turbidity, pH, temperature and conductivity.

2.5.3.1 POC Well Installation

Groundwater monitor wells must be installed at POC locations M54-LBF, M54-O and M52-UBF in accordance with the Compliance Schedule, Section 3.0.

2.5.3.2 Ambient Groundwater Monitoring for POCs

A minimum of eight (8) and a maximum of twelve (12) rounds of groundwater sampling are required to establish ambient groundwater quality at POC wells M54-LBF, M54-O and M52-UBF and any other additional POCs required to be installed as part of the Compliance Schedule (Section 3.0). Groundwater samples shall be obtained no more frequently than bi-weekly and no less frequently than quarterly. Each ambient sample shall be analyzed for the parameters listed in Section 4.1, Table 4.1-5. Alert levels and aquifer quality limits shall be established as required in Sections 2.5.3.2.1 and 2.5.3.2.2.

2.5.3.2.1 Alert Levels for POC Wells

ALs for POC wells will be calculated for all parameters with an established AWQS and for the other sampling parameters listed as “reserved” in Section 4.1, Table 4.1-6 and Table 4.1-7 within 30 days of receipt of the laboratory analyses for the final sampling round of the ambient groundwater monitoring period for each POC well list in Section 2.4. The permittee shall submit the ambient groundwater monitoring data in tabulated form to the ADEQ Water Permits Section (WPS) for review. Copies of all laboratory analytical reports, field notes, and the Quality Assurance/Quality Control (QA/QC) procedures used in the collection and analyses of the samples for all parameters listed in Section 4.1, Tables 4.1-6 and 4.1-7 shall be submitted to the WPS.

The permittee may submit a report with the calculations for each AQL and AL included in the permit for review and approval by ADEQ, or the permittee may defer calculation of the AQLs and ALs to the WPS. The AQLs and ALs shall be established and calculated by the following formula or another valid statistical method submitted to WPS in writing and approved for this permit by the WPS:

$$AL = M + KS$$

Where M = mean, S = standard deviation, and K = one-sided normal tolerance interval with a 95% confidence level (Lieberman, G.J. (1958) Tables for One-sided Statistical Tolerance Limits: Industrial Quality Control, Vol. XIV, No. 10). Obvious outliers should be excluded from the data used in the AL calculation.

The following criteria shall be met in establishing ALs in the permit for constituents with an AWQS:

1. The AL shall be calculated for a parameter using the analyses from a minimum of eight (8) and maximum of twelve (12) consecutive sample rounds.
2. Any data where the practical quantification limit (PQL) exceeds 80% of the AWQS shall not be included in the AL calculation.
3. If a parameter is below the detection limit, the permittee must report the value as “less than” the numeric value for the PQL or detection limit for the parameter, not

- just as “non-detect”. For those parameters, the permittee shall use a value of one-half the reported detection limit for the AL calculation.
4. If the analytical results from more than 50% of the samples for a specific parameter are non-detect, then the AL shall be set at 80% of the AWQS.
 5. If the calculated AL for a specific constituent and well is less than 80% of the AWQS, the AL shall be set at 80% of the AWQS for that constituent in that well.

The following criteria shall be met in establishing ALs in the permit for constituents without an AWQS:

1. The AL shall be calculated for a parameter using the analyses from a minimum of eight (8) and maximum of twelve (12) consecutive sample rounds
2. If a parameter is below the detection limit, the permittee must report the value as “less than” the numeric value for the PQL or detection limit for the parameter, not just as “non-detect”. For those parameters, the permittee shall use a value of one-half the reported detection limit for the AL calculation.

2.5.3.2.2 Aquifer Quality Limits for POC Wells

AQLs for POC wells will be calculated for each of the analytes for which a numeric AWQS has been adopted within 30 days of receipt of the laboratory analyses for the final sampling round of the ambient groundwater monitoring period for each POC well list in Section 2.4. For each of the monitored analytes for which a numeric AWQS has been adopted, the AQL shall be established as follows:

1. If the calculated AL is less than the AWQS, then the AQL shall be set equal to the AWQS.
2. If the calculated AL is greater than the AWQS, then the AQL shall be set equal to the calculated AL value, and no AL shall be set for that constituent at that monitoring point.

2.5.3.3 Quarterly Compliance Groundwater Monitoring for POCs

The permittee shall perform quarterly compliance groundwater monitoring of the POC wells as specified in Section 4.1, Table 4.1-6. The results of the monitoring shall be compared to the AQLs and ALs.

The permittee shall submit reports of the quarterly compliance monitoring in accordance with the reporting schedule at Section 2.7.6.

2.5.3.4 Semi-Annual Compliance Monitoring for POCs

The permittee shall perform semi-annual compliance monitoring of the POC wells as specified in Section 4.1, Table 4.1-7. The results of the monitoring shall be compared to the AQLs and ALs.

The permittee shall submit reports of the semi-annual compliance monitoring in accordance with the reporting schedule at Section 2.7.6.

2.5.3.5 Point of Compliance Well Replacement

In the event that one or more of the designated POC wells should become unusable or inaccessible due to damage, or any other event, a replacement POC well shall be constructed and installed upon approval by ADEQ. If the replacement well is 50 feet or less from the original well, the ALs and/or AQLs calculated for the designated POC well shall apply to the replacement well.

2.5.4 Surface Water Monitoring and Sampling Protocols

Not applicable to this permit.

2.5.5 Analytical Methodology

All samples collected for compliance monitoring and soil sampling shall be analyzed using Arizona state-approved methods. If no state-approved method exists, then any appropriate EPA-approved method shall be used. Regardless of the method used, the detection limits must be sufficient to determine compliance with the regulatory limits of the parameters specified in this permit. Analyses shall be performed by a laboratory licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification. For results to be considered valid, all analytical work shall meet quality control standards specified in the approved methods. A list of Arizona state-certified laboratories can be obtained at the address below:

Arizona Department of Health Services
Office of Laboratory Licensure and Certification
250 North 17th Avenue
Phoenix, AZ 85007
Phone: (602) 364-0720

2.5.6 Installation and Maintenance of Monitoring Equipment

Monitoring equipment required by this permit shall be installed and maintained so that representative samples required by the permit can be collected. If new groundwater wells are determined to be necessary, the construction details shall be submitted to the ADEQ Water Permits Section for approval prior to installation and the permit shall be amended to include any new monitoring points.

2.5.7 Protection of Downgradient Uses - Arsenic

For purposes of this permit, ADEQ has established a use protection level (UPL) for arsenic of 0.01 milligrams per liter (mg/L), consistent with EPA's primary drinking water standard for arsenic. The northwest corner of the State Mineral Lease Land, on which the PTF shall be located, has been conservatively designated as the downgradient point at which the arsenic UPL will be applied. Consistent with ADEQ's substantive policy statement titled "Using Narrative Aquifer Water Quality Standards to Develop Permit Conditions for Aquifer Protection Permits" (Oct. 2003), an alert level for arsenic shall be established for each of the POC wells M14-GL, M15-GU, M22-O, M23-UBF, M54-LBF, and M54-O for the in-situ well field through consideration of fate and transport of arsenic in groundwater to ensure that the UPL is not exceeded at the northwest corner of the State Mineral Lease Land (See Compliance Schedule, Section 3.0).

2.5.8 BADCT Monitoring Wells (Non-POC)

2.5.8.1 Monitoring well MW-01

Monitor well MW-01 shall be installed and approved by ADEQ in accordance with the Compliance Schedule, Section 3.0. Monitoring well MW-01 shall be located in the down gradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 shall be a nested well screened separately across each proposed injection zone targeted for in-situ leaching, and into the LBFU. Monitoring requirements for this well are listed in Section 4.1, Tables 4.1-6b, 4.1-7b and 4.1-8.

2.5.8.2 Supplemental Wells

Supplemental wells shall be installed and approved by ADEQ in accordance with the Compliance Schedule, Section 3.0. The Supplemental wells are located in order to provide groundwater data and potentiometric surface data during the duration of the PTF test. Monitoring requirements for these wells are listed in Section 4.1, Tables 4.1-6b, 4.1-7b and 4.1-8.

TABLE 2.5-1 GROUNDWATER MONITORING WELL						
Well #	ADWR No.	Total Depth (ft. bgs)	Latitude	Longitude	Screened Interval (ft. bgs)	Aquifer Unit
MW-01	TBD	1,200	TBD	TBD	320-600 and 620-1,200	LBFU and Oxide
SUPPLEMENTAL GROUNDWATER MONITORING WELLS						
M55-UBF	TBD	260	33° 03' 1.99"N	111° 26' 6.18"W	240-260	UBFU
M56-LBF	TBD	340	33° 03' 2.21"N	111° 26' 6.44"W	320-340	LBFU
M57-O	TBD	1200	33° 03' 1.88"N	111° 26' 8.39"W	525-1200	Oxide
M58-O	TBD	1200	33° 03' 5.20"N	111° 26' 4.94"W	598-1200	Oxide
M59-O	TBD	1200	33° 03' 1.58"N	111° 26' 2.25"W	535-1200	Oxide
M60-O	TBD	1200	33° 02' 58.70"N	111° 26' 5.78"W	445-1200	Oxide
M61-LBF	TBD	635	33° 03' 0.85"N	111° 25' 58.92"W	435-635	LBFU

2.5.8.3 Observation Wells

Observation wells shall be installed and approved by ADEQ in accordance with the Compliance Schedule, Section 3.0. The Observation wells are located in order to provide data for inward hydraulic gradient and electrical conductivity monitoring. These wells are also used in generating potentiometric surface maps. Monitoring requirements for these wells is listed in Section 4.1, Table 4.1-8.

TABLE 2.5-2 OBSERVATION WELLS						
Well #	ADWR No.	Interval (ft. bgs.)	Latitude	Longitude	Total Depth (ft. bgs.)	Aquifer Unit
O-01	TBD	473-1200	33° 03' 2.09"N	111° 26' 3.71"W	1200	Oxide
O-02	TBD	444-1200	33° 03' 1.39"N	111° 26' 3.03"W	1200	Oxide
O-03	TBD	438-1200	33° 02' 59.99"N	111° 26' 3.04"W	1200	Oxide
O-04	TBD	450-1200	33° 02' 59.29"N	111° 26' 5.54"W	1200	Oxide
O-05	TBD	423-1200	33° 02' 59.99"N	111° 26' 6.36"W	1200	Oxide
O-06	TBD	433-1200	33° 03' 1.396"N	111° 26' 6.35"W	1200	Oxide
O-07	TBD	476-1200	33° 03' 2.08"N	111° 26' 5.51"W	1200	Oxide

2.5.8.4 Multi-Level Wells

The Multi-Level wells are primarily used for obtaining process solution chemistry during the PTF operation between injection and recovery wells. These wells shall be monitored for well bore electrical conductivity as required in Section 4.1, Table 4.1-8.

TABLE 2.5-3 MULTI-LEVEL WELLS FOR WELL BORE ELECTRICAL CONDUCTIVITY				
Well #	DWR #	Latitude	Longitude	Aquifer Unit
WB-01	TBD	33° 03' 1.04"N	111° 26' 4.69"W	UBFU
WB-02	TBD	33° 03' 0.69"N	111° 26' 4.29"W	UBFU
WB-03	TBD	33° 03' 0.35"N	111° 26' 4.70"W	UBFU
WB-04	TBD	33° 03' 0.69"N	111° 26' 5.11"W	UBFU

2.5.8.5 Ambient Groundwater Monitoring for Supplemental Wells and MW-01

A minimum of eight (8) and a maximum of twelve (12) rounds of groundwater sampling are required to establish ambient groundwater quality for wells listed in Table 2.5-1 as part of the Compliance Schedule (Section 3.0). Groundwater samples shall be obtained no more frequently than bi-weekly and no less frequently than quarterly. Each ambient sample shall be analyzed for the parameters listed in Section 4.1, Table 4.1-5. Alert levels shall be established as required in Sections 2.5.8.5.1.

2.5.8.5.1 Alert Levels for Supplemental Wells and MW-01

ALs for Supplemental wells and MW-01 will be calculated for all parameters with an established AWQS and for the other sampling parameters listed as "reserved" in Section 4.1, Table 4.1-6.B and Table 4.1-7.B within 30 days of receipt of the laboratory analyses for the final sampling round of the ambient groundwater monitoring period for each Operational Monitoring well list in Section 2.5.8. The permittee shall submit the ambient groundwater monitoring data in tabulated form to the ADEQ Water Permits Section (WPS) for review. Copies of all laboratory analytical reports, field notes, and the Quality Assurance/Quality Control (QA/QC) procedures used in the collection and analyses of the samples for all parameters listed in Section 4.1, Tables 4.1-6.B and 4.1-7.B shall be submitted to the WPS.

The permittee may submit a report with the calculations for each AL included in the permit for review and approval by ADEQ, or the permittee may defer calculation of ALs to the WPS. The ALs shall be established and calculated by the following formula or another valid statistical method submitted to WPS in writing and approved for this permit by the WPS:

$$AL = M + KS$$

Where M = mean, S = standard deviation, and K = one-sided normal tolerance interval with a 95% confidence level (Lieberman, G.J. (1958) Tables for One-sided Statistical Tolerance Limits: Industrial Quality Control, Vol. XIV, No. 10). Obvious outliers should be excluded from the data used in the AL calculation.

The following criteria shall be met in establishing ALs in the permit for constituents with an AWQS:

1. The AL shall be calculated for a parameter using the analyses from a minimum of eight (8) and maximum of twelve (12) consecutive sample rounds
2. Any data where the practical quantification limit (PQL) exceeds 80% of the AWQS shall not be included in the AL calculation.

3. If a parameter is below the detection limit, the permittee must report the value as “less than” the numeric value for the PQL or detection limit for the parameter, not just as “non-detect”. For those parameters, the permittee shall use a value of one-half the reported detection limit for the AL calculation.
4. If the analytical results from more than 50% of the samples for a specific parameter are non-detect, then the AL shall be set at the AWQS.

The following criteria shall be met in establishing ALs in the permit for constituents without an AWQS:

1. The AL shall be calculated for a parameter using the analyses from a minimum of eight (8) and maximum of twelve (12) consecutive sample rounds
2. If a parameter is below the detection limit, the permittee must report the value as “less than” the numeric value for the PQL or detection limit for the parameter, not just as “non-detect”. For those parameters, the permittee shall use a value of one-half the reported detection limit for the AL calculation.

2.5.9 Ambient LBFU Bulk Electrical Conductivity

Four conductivity probes (sensors) shall be placed within the annulus of each of the seven PTF observation wells, and shall be installed with a spacing of 20 feet between sensors, with the lowest sensor placed in the middle of the exclusion zone. Background monitoring shall consist of a minimum of 5 monitoring events per week, for a minimum of four (4) weeks, resulting in a total of 20 monitoring events. Each monitoring event shall consist of sequentially energizing each of the 28 sensors, and recording the signal received at the other 27 sensors. This process shall be repeated until each of the sensors has been energized and the resulting signals recorded.

The permittee shall submit the ambient LBFU Bulk Electrical Conductivity data in tabulated form to the ADEQ WPS for review. Copies of all data collection records, field notes, and the Quality Assurance/Quality Control (QA/QC) procedures used in the collection and analyses of the conductivity data shall be submitted to the WPS. The permittee shall submit a report with the calculations for the background bulk conductivity values for review and approval by ADEQ. The report shall include:

1. Outlier test to identify observations that deviate markedly from other observations in the dataset.
2. An analysis of variance (ANOVA) of means.
3. A regression analysis to identify which observed variations are significant and to identify interfering correlations which could be affecting the observations (e.g. temperature, time of day, electrical storm activity, etc.).

The report shall describe the electrical conductivity dataset distribution and shall identify the appropriate statistical procedure (parametric or non-parametric) by which the ANOVA shall be performed and the appropriate limits to be applied. This report shall be sealed by an appropriate Arizona Registrant.

The AL in Table 4.1-8 is currently “Reserved” and shall be calculated using an ANOVA method or another valid statistical method submitted to WPS in writing and approved for this permit by the WPS.

2.6 Contingency Plan Requirements**[A.R.S. § 49-243(K)(3), (K)(7) and A.A.C. R18-9-A204 and R18-9-A205]****2.6.1 General Contingency Plan Requirements**

At least one copy of this permit and the approved contingency and emergency response plans submitted in the application shall be maintained at the location where day-to-day decisions regarding the operation of the facility are made. The permittee shall be aware of and follow the contingency and emergency plans.

Any AL that is exceeded or any violation of an AQL, discharge limit (DL), or other permit condition shall be reported to ADEQ following the reporting requirements in Section 2.7.3.

Some contingency actions may involve verification sampling. Verification sampling shall consist of the first follow-up sample collected from a location that previously indicated a violation or the exceedance of an AL. Collection and analysis of the verification sample shall use the same protocols and test methods to analyze for the pollutant or pollutants that exceeded an AL or violated an AQL. The permittee is subject to enforcement action for the failure to comply with any contingency actions in this permit. Where verification sampling is specified in this permit, it is the option of the permittee to perform such sampling. If verification sampling is not conducted within the timeframe allotted, ADEQ and the permittee shall presume the initial sampling result to be confirmed as if verification sampling has been conducted. The permittee is responsible for compliance with contingency plans relating to the exceedance of an AL or violation of a DL, AQL or any other permit condition.

2.6.2 Exceeding of Alert Levels**2.6.2.1 Exceeding of Alert Levels Set for Operational Conditions**

1. If an Operational Condition for BADCT in Section 4.1, Table 4.1-3 has been exceeded, the permittee shall:
 - a. Notify the ADEQ Water Quality Compliance Section within five (5) days of becoming aware of a violation of any permit condition in accordance with Section 2.7.3 (Permit Violation and Alert Level Reporting), unless other reporting is specified in Section 4.1, Table 4.1-3.
 - b. Submit a written report within thirty (30) days after becoming aware of a violation of a permit condition in accordance with Section 2.7.3. The report shall document all of the following:
 - i. a description of the exceeded value or performance standard and its cause;
 - ii. the period of violation, including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue;
 - iii. any action taken or planned to mitigate the effects of the violation, or the spill, or to eliminate or prevent recurrence of the violation;
 - iv. any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an Aquifer Water Quality Standard; and
 - v. any malfunction or failure of pollution control devices or other equipment or process.
2. The facility is no longer on alert status once the operational indicator no longer indicates that an Operational Condition is being exceeded. The permittee shall, however, complete all tasks necessary to return the facility to its pre-alert operating condition.

2.6.2.2 Exceedance of Alert Level #1 for Normal Liner Leakage

If an Alert Level #1 (AL #1) as specified in Section 4.1, Table 4.1-4, has been exceeded, the permittee shall take the following actions:

1. Within 5 days of discovery, determine if the fluid in the collection sump is operational/process water from the impoundment by measuring the pH and conductivity of fluids in the impoundment and in the sump to allow direct comparison in wastewater quality. Notify ADEQ Water Quality Compliance Section in accordance with Section 2.7.3(1) (Permit Violation and AL Status Reporting), and include in the notification an assessment of the type of water in the sump. Monitor fluid removal from the LCRS on a daily basis until the daily volume of fluid quantified remains below AL#1 for 30 days in order to minimize the hydraulic head on the lower liner.
2. Within 15 days of discovery, assess the condition of the liner system using visual methods for visible portions of the liner, electrical leak detection, or other methods as applicable to determine the location of leaks in the primary liner. If liner damage is evident, the permittee shall complete liner repairs and submit documentation of the repairs in the initial report discussed in Item No. 3 below.
3. Within 30 days of discovery of exceeding AL#1, the permittee shall submit an initial report to ADEQ Water Quality Compliance Section to address problems identified from the initial assessment of the liner system, the source of the fluid, and any remedial actions taken to minimize the future occurrences. The report shall include the results of the initial liner evaluation, methods used to locate the leak(s) if applicable, any repair procedures implemented to restore the liner to optimal operational status if required, and other information necessary to ensure the future occurrence of the incidence will be minimized. The permittee shall also submit the report required under Section 2.7.3.
4. For leakage rates that continue to exceed AL #1 and are below AL #2, a Liner Leakage Assessment Report shall be included in the next annual report described in Section 2.7.4 (Operational, Other or miscellaneous Reporting) of this permit. The permittee may also submit the Liner Leakage Assessment Report to the ADEQ prior to the annual report due date. This Liner Leakage Assessment Report shall be submitted to both the ADEQ Water Quality Compliance Section and the ADEQ Water Permits Section.

ADEQ will review the Liner Leakage Assessment Report and may require that the permittee take additional action to address the problems identified from the assessment of the liner and perform other applicable repair procedures as directed by the ADEQ, including repair of the liner or addressing and controlling infiltration of non-operational water detected in the LCRS.

2.6.2.3 Exceedance of Alert Level #2 (Discharge Limit) for Liner Failure or Rips

If the Liner Leakage Discharge Limit (AL #2) specified in Section 4.1, Table 4.1-4, has been exceeded, the permittee shall:

1. Immediately cease all discharge to the impoundment, and notify ADEQ's Water Quality Compliance Section orally, electronically, or, by facsimile, of the AL #2 exceedance. Within 24 hours, determine if water in the collection sump is operational/process water from the impoundment by measuring the pH and conductivity of fluids contained in the impoundment and in the sump to allow direct comparison in water quality.
2. Within 5 days of discovery, notify ADEQ Water Quality Compliance Section, in accordance with Section 2.7.3 (Permit Violation and AL Status Reporting) and include an assessment regarding the type of water in the sump based upon the measurements taken according to Item No. 1 listed above.
3. Within 15 days of discovery identify the location of the leak(s) using visual methods, electrical leak detection, or other methods as applicable. If liner damage is evident, the permittee shall complete liner repairs and submit documentation of the repairs in Item No. 4 below. Discharge to the impoundment shall not be re-initiated until the leak(s) have been identified and repaired.

4. Within 30 days of exceeding AL #2, submit a report to ADEQ as specified in Section 2.7.3 (Permit Violation and AL Status Reporting). The report shall include the results of the initial liner evaluation, methods used to locate the leak(s) if applicable, any repair procedures and quality assurance/quality control implemented to restore the liner to optimal operational status if required, and other information necessary to ensure the future occurrence of the incidence will be minimized. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
5. If AL #2 continues to be exceeded following completion of repairs, submit for approval to ADEQ, a corrective action plan including a schedule to complete the corrective actions to address all problems identified from the assessment of the liner system and surface releases, if any, within 60 days of completion of repairs conducted in response to Item No. 3 above. Upon ADEQ's approval, the permittee shall implement the approved plan and schedule of corrective actions.
6. Within 30 days of completion of corrective actions, submit to ADEQ, a written report as specified in Section 2.6.6 (Corrective Actions).

2.6.2.4 Exceeding of Alert Levels in Groundwater Monitoring

2.6.2.4.1 Alert Levels for Indicator Parameters

1. If an AL in Section 4.1 Table 4.1-6, 4.1-6B, 4.1-7 or Table 4.1-7B been exceeded, the permittee shall request that the laboratory verify the sample results within 5 days. If the analysis does not confirm that an exceedance has occurred, no further action is required.
2. Within 5 days after receiving laboratory confirmation of an AL being exceeded, the permittee shall notify the ADEQ Water Quality Compliance Section and submit written confirmation within 30 days of receiving the laboratory confirmation of an AL exceedance.
3. If the results indicate an exceedance of an AL, the permittee shall conduct a verification sample of groundwater from the well within 15 days from laboratory confirmation. If the verification sample does not confirm that an exceedance has occurred, the permittee shall notify ADEQ Water Quality Compliance Section of the results. No further action is required under this subsection.
4. If verification sampling confirms that the AL has been exceeded, the permittee shall increase the frequency of monitoring to monthly and analyze for the entire list of parameters listed in Section 4.1, Table 4.1-6 or Table 4.1-6B, and increase the monitoring frequency to quarterly for parameters listed in Tables 4.1-7 or 4.1-7B. In addition, the permittee shall immediately investigate the cause of the exceedance and report the results of the investigation with the 30 day confirmation noted above. ADEQ may require additional investigations, the installation of additional wells or corrective action in response to the report. The permittee shall continue monthly testing for the parameter(s) until the parameter(s) has remained below the AL for three consecutive monthly sampling events.

2.6.2.4.2 Alert Levels for Pollutants with Numeric Aquifer Water Quality Standards

1. If an AL for a pollutant set in Section 4.1, Table 4.1-6, 4.1-6B, 4.1-7 or Table 4.1-7B has been exceeded, the permittee may conduct verification sampling within 5 days of becoming aware of an AL exceedance. The permittee may use the results of another sample taken between the date of the last sampling event and the date of receiving the result as verification.
2. If verification sampling confirms the AL exceedance or if the permittee opts

not to perform verification sampling, then the permittee shall increase the frequency of monitoring to monthly. In addition, the permittee shall immediately initiate an investigation of the cause of the AL exceedance, including inspection of all discharging facilities and all related pollution control devices, review of any operational and maintenance practices that might have resulted in an unexpected discharge, and hydrologic review of groundwater conditions including upgradient water quality from existing wells.

3. The permittee shall initiate actions identified in the approved contingency plan referenced in Section 3.0 and specific contingency measures identified in Section 2.6 to resolve any problems identified by the investigation which may have led to an AL exceedance. To implement any other corrective action the permittee shall obtain prior approval from ADEQ according to Section 2.6.6. Alternatively, the permittee may submit a technical demonstration, subject to written approval by the Water Permits Section, that although an AL is exceeded, pollutants are not reasonably expected to cause a violation of an AQL. The demonstration may propose a revised AL or monitoring frequency for approval in writing by the Water Permits Section.
4. Within 30 days after confirmation of an AL exceedance, the permittee shall submit the laboratory results to the Water Quality Compliance Section along with a summary of the findings of the investigation, the cause of the AL exceedance, and actions taken to resolve the problem.
5. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, or other actions.
6. The increased monitoring required as a result of an AL exceedance may be reduced to the regularly scheduled frequency, if the results of three (3) sequential sampling events demonstrate that no parameters exceed the AL.
7. If the increased monitoring required as a result of an AL exceedance continues for more than six (6) sequential sampling events, the permittee shall submit a second report documenting an investigation of the continued AL exceedance within 30 days of the receipt of laboratory results of the sixth sampling event.

2.6.2.4.3 Alert Levels to Protect Downgradient Users from Pollutants Using a Narrative Aquifer Water Quality Standard

1. If an AL set for arsenic in Section 4.1, Table 4.1-6 or 4.1-7 has been exceeded, the permittee shall conduct verification sampling within 5 days of becoming aware of an AL exceedance.
2. If verification sampling confirms that the AL has been exceeded, the permittee shall investigate the cause of the exceedance and shall submit a report regarding the exceedance to ADEQ within 30 days of the date of verification sample. The report shall identify the cause and source(s) of the exceedance and shall propose actions to mitigate the exceedance. The report shall also present groundwater modeling to establish a projected relationship of the wells in which exceedance(s) were found and the downgradient boundary of the Arizona State Land Department property at the facility.
3. The permittee shall notify all downgradient users of the aquifer who may be directly affected by the discharge within 24 hours of receiving the results of verification confirmation sampling.

2.6.2.5 Exceeding of BADCT Alert Levels for Injection/Recovery Well Operation

The permittee shall initiate the following actions within 24 hours of becoming aware of an Alert Level exceedance listed in Section 4.1 Table 4.1-8 for the loss of hydraulic control within the in-situ leaching area for more than 24 consecutive hours. A loss of hydraulic control occurs when the amount of fluids injected during a 24 hour period exceeds the amount of fluid recovered for the same 24 hour period. Loss of hydraulic control is also indicated by a less than 1-foot differential observed in any pair of observation and recovery wells over a 24 hour period. The permittee shall:

1. Notify the ADEQ Water Quality Compliance Section within one (1) day of becoming aware of the alert level exceedance.
2. Adjust flow rates at injection/recovery wells until the recovery volume is greater than the injected volume,
3. Conduct an inspection, testing of piping, and wellhead for leaks; injection and recovery lines, pumps, flow meters, totalizers, pressure gauges, pressure transducers, and other associated facilities,
4. Review of recent process logs, continuous chart recordings, meter readings, and other operational control information to identify any unusual occurrences,
5. Initiate pressure testing of the appropriate wells if the loss of fluids cannot be determined to be caused by a surface facility failure, and
6. Repair system as necessary.
7. Within one week submit a report to ADEQ Water Quality Compliance Section. The report shall include but not be limited to providing the following information: a) injected volume in the period prior to the alert level exceedance, b) recovered volume in the period prior to the alert level exceedance, c) corrective action taken.
8. The permittee is no longer considered to be in violation if the injection rate and recovery rates are re-established and maintained at normal operating conditions following the completion of the corrective actions.

If the exceedance of the Alert Level is determined to be a result of a planned disruption or power outage, the cause will be noted in the log book as required by Section 2.7.2.

If a leak is detected, operation of the well shall cease until the leak has been repaired and mechanical integrity demonstrated to minimize the potential for groundwater pollution.

Within 30 days of the initial AL exceedance caused by a leak, the permittee shall submit a report to ADEQ WPS at the address shown in Section 2.7.5. This report shall document all submittals to EPA, including but not limited to, monitoring and report data and reports checking engineering and integrity of the well.

The facility is no longer on alert status once the operational indicator no longer indicates that an AL is being exceeded. The permittee shall, however, complete all tasks necessary to return the facility to its pre-alert operating condition.

2.6.2.6 Exceeding of Alert Levels Set for Maximum Injection Pressure

The permittee shall initiate the following actions within 24 hours of becoming aware of an Alert Level exceedance listed in Section 4.1, Table 4.1-8 for the exceedance of a fracture gradient. The permittee shall:

1. Immediately investigate to determine the cause of the AL being exceeded, including:
 - a. Inspection, testing, and assessment of the current condition of all components

- of the injection system that may have contributed to the AL being exceeded, which may include taking the affected well(s) out of service, and
 - b. Review of all data logger information, test results, and other operational control information to identify any unusual occurrences.
 - c. Repair system as necessary.
2. Within 30 days of an AL being exceeded, the permittee shall submit the related data to the ADEQ Water Quality Compliance Section, along with a summary of the findings of the investigation, the cause of the AL being exceeded, and actions taken to resolve the problem. This report shall document all submittals to EPA, including but not limited to, monitoring and report data and reports checking engineering and integrity of the well.
 3. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions or other actions.
 4. The facility is no longer on alert status once the operational indicator no longer indicates that an AL is being exceeded. The permittee shall, however, complete all tasks necessary to return the facility to its pre-alert operating condition.

2.6.2.7 Exceeding Alert Levels for LBFU Bulk Electrical Conductivity Monitoring

The permittee shall initiate the following actions within 24 hours of becoming aware of an Alert Level exceedance listed in Section 4.1, Table 4.1-8 for the exceedance of LBFU Bulk Electrical Conductivity. The permittee shall:

1. Within 14 days of the Alert Level exceedance, the permittee shall collect three additional independent conductivity measurements conducted over a period of six days.
2. Within 5 days of receiving the verification results, if the verified conductivity values remain above Alert Levels, the permittee shall notify ADEQ that further contingency action is being conducted.
3. If the verification measurements indicate an Alert Level exceedance has not occurred, the permittee shall notify ADEQ of the results. No further action is required until the next monitoring round.
4. Within 30 days of receiving conductivity measurement results indicating an Alert Level exceedance has occurred, the permittee shall submit a written report to ADEQ providing an evaluation of the cause, impacts, or mitigation of the discharge responsible for the increase in conductivity, or submit a written report which demonstrates that the increase resulted from errors in conductivity measurement, data analysis, or statistical evaluation.
5. If an Alert Level exceedance is verified, the permittee shall:
 - a. Reduce the injection rate and increase the extraction rate in the area of the increased conductivity values for period of time equal to the period spanning from the previous measurement wherein conductivity values were within the range of background values until the time when the Alert Level exceedance was verified.
 - b. Increase conductivity monitoring frequency from weekly to three times per week.
 - c. If conductivity values remain at levels that exceed Alert Levels, and do not show any decrease after a period of 60 days of reduced injection and increased pumping, the sampling frequency for level 1 parameters at operational monitoring well MW-01 shall be increased to weekly, and level 2 monitoring parameters shall be increased to quarterly.
 - d. If conductivity values remain at levels that exceed Alert Levels, and does not return to below the AL after a period of 60 days of reduced injection and increased pumping, the permittee shall cease injecting solutions and continue extraction until Bulk Electrical Conductivity concentrations do not exceed the Alert Level.

2.6.2.8 Exceeding Alert Levels for Well Bore Electrical Conductivity

The permittee shall initiate the following actions within 24 hours of becoming aware of an Alert Level exceedance listed in Section 4.1, Table 4.1-8 for the exceedance of Well Bore Electrical Conductivity. The permittee shall:

1. Verify the reading from the annular conductivity device, to confirm there was an AL exceedance. If verification does not confirm an AL exceedance, the permittee can resume normal operations and notify WPS in accordance with Section 2.7.3.
2. If verification confirms an AL exceedance, the permittee shall notify the ADEQ Water Quality Compliance Section within one (1) day of becoming aware of the alert level exceedance.
3. Increase Well Bore Electrical Conductivity monitoring required in Table 4.1-8 to monthly,
4. Increase LBFU Bulk Electrical Conductivity monitoring required in Table 4.1-8 to three times per week,
5. Repair system as necessary.
6. Within 30 days of repairing the system, the permittee shall submit a written report to the Water Quality Compliance Section and WPS documenting the repair of the system and providing an evaluation of the cause, impacts, or mitigation any impacts to the LBFU, MFGU and/or UBFU.

2.6.2.9 Exceeding Alert Levels for Fluid Electrical Conductivity

The permittee shall initiate the following actions within 24 hours of becoming aware of an Alert Level exceedance listed in Section 4.1, Table 4.1-8 for the exceedance of fluid sample electrical conductivity. The permittee shall:

1. Immediately verify the fluid sample electrical conductivity. If the verification sample does not confirm that an exceedance has occurred, the permittee shall notify the ADEQ Water Quality Compliance Section and WPS of the results. No further action is required.
2. Within 24-hours of confirmation of an AL being exceeded, the permittee shall notify the ADEQ Water Quality Compliance Section and WPS and immediately investigate the cause of the exceedance.
3. The permittee shall report the results of the investigation within 30 days of confirmation. ADEQ may require reduction of injection rates and increase of pumping rates, additional investigations, the installation of additional wells or corrective action in response to the report

2.6.2.10 Exceeding an Alert Level for Cone of Depression

The permittee shall initiate the following actions within 24 hours of becoming aware of an Alert Level exceedance listed in Section 4.1, Table 4.1-8 for the cone of depression. The permittee shall:

1. Within 48 hour of becoming aware of the Alert Level exceedance, verify whether an exceedance has occurred by completing the following:
 - a. Evaluate whether the data collection protocols have been properly followed.
 - b. Review field notes for indications of unusual circumstances that may have occurred during the collection of the data.
 - c. Review daily injection and pumping values at the PTF well field at the time of the measurements to confirm that extraction was greater than injection during that period in accordance with Section 2.7.4.4(2), Table 4.1-1 and Table 4.1-8.
 - d. Evaluate the pumping conditions at other nearby wells during the time of measurements (i.e. were POC, supplemental, MW-1 wells being purged).

- e. Inspect the equipment used to collect the field measurements.
 - f. Determine if the measurement equipment was different from past collection periods, and evaluate the potential effects of differences between the equipment used.
 - g. Check the calibration of the equipment used (water sounder, pressure transducers, etc.).
2. If an exceedance is not verified, the permittee shall notify the ADEQ Water Quality Compliance Section and WPS of the results of the verification. No further action is required.
 3. If an exceedance is verified, the permittee shall:
 - a. Reduce the injection rate and increase the pumping rate at the recovery wells to a rate that will cause the cone of depression to no longer exceed the alert level, and notify ADEQ WQCS and WPS within 24 hours.
 - b. Increase the frequency of potentiometric surface map compilation to weekly until water level measurements confirm that the cone of depression alert level is no longer exceeded.
 - c. If the cone of depression does not meet the alert level after a period of 30 days of reduced injection and increased pumping, the permittee shall immediately cease injecting solutions, continue extracting until the cone of depression no longer exceeds the alert level, increase the frequency of Level 1 monitoring to monthly and increase the frequency of monitoring the level 2 parameters to quarterly at all Oxide Supplemental Wells (M57-O, M58-O, M59-O and M60-O) and MW-01. Upon taking these actions, the permittee shall notify ADEQ WQCS and WPS within 3 days.
 4. Once the alert level is no longer exceeded, the permittee shall prepare a summary report to be submitted to ADEQ Water Quality Compliance Section and WPS within 30 days summarizing the findings and actions taken to extend the cone of depression to the PMA boundary.

2.6.3 Discharge Limitations Violations

2.6.3.1 Liner Failure, Containment Structure Failure, or Unexpected Loss of Fluid

In the event of overtopping, liner failure, containment structure failure, or unexpected loss of fluid as described in Section 2.3, the permittee shall take the following actions:

1. As soon as practicable, cease all discharges as necessary to prevent any further releases to the environment.
2. Within 24 hours of discovery, notify ADEQ Water Quality Compliance Section, Enforcement Unit, orally, electronically, or by facsimile.
3. Within 24 hours of discovery of a failure that resulted in a release to the subsurface, collect representative samples of the fluid remaining in affected impoundments and drainage structures, analyze sample(s) according to Section 4.1, Table 4.1-2C and report in accordance with Section 2.7.3 (Permit Violation and AL Status Reporting). In the 30-day report required under Section 2.7.3, include a copy of the analytical results and forward the report to ADEQ Water Quality Compliance Section, Enforcement Unit and Water Permits Section.
4. Within 15 days of discovery, initiate an evaluation to determine the cause for the incident. Identify the circumstances that resulted in the failure and assess the condition of the discharging facility and liner system. Implement corrective actions as necessary to resolve the problems identified in the evaluation. Initiate repairs to any failed liner, system, structure, or other component as needed to restore proper functioning of the discharging facility. The permittee shall not resume discharging to the discharging facility until repairs of any failed liner or structure are performed. Repair procedures, methods, and materials used to restore the system(s) to proper operating condition shall

- be described in the facility log/recordkeeping file and available for ADEQ review.
5. Record in the facility log/recordkeeping file the amount of fluid removed, a description of the removal method, and other disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).
 6. Within 30 days of discovery of the incident, submit a report to ADEQ as specified in Section 2.7.3. Include a description of the actions performed in Subsections 1 through 5 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
 7. Within 60 days of discovery, conduct an assessment of the impacts to the subsoil and/or groundwater resulting from the incident. This assessment may include the installation of POC(s) to determine down-gradient groundwater impact from the incident along with commencement of groundwater monitoring per Section 4.1, Table 4.1-7. If soil or groundwater is impacted such that it could or did cause or contribute to an exceedance of an AQL at the applicable point of compliance, submit to ADEQ, for approval, a corrective action plan to address such impacts, including identification of remedial actions and a schedule for completion of activities. At the approval of ADEQ, the permittee shall implement the approved plan.
 8. Within 30 days of completion of corrective actions, submit to ADEQ, a written report as specified in Section 2.6.6 (Corrective Actions).
 9. Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

2.6.3.2 Overtopping of a Surface Impoundment

If overtopping of fluid from a permitted surface impoundment occurs, and results in a discharge pursuant to A.R.S. § 49-201(12), the permittee shall:

1. As soon as practicable, cease all discharges to the surface impoundment to prevent any further releases to the environment.
2. Within 24 hours of discovery, notify ADEQ Water Quality Compliance Section, Enforcement Unit.
3. Within 24 hours, collect representative samples of the fluid contained in the surface impoundment. Samples shall be analyzed for the parameters specified in Section 4.1, Table 4.1-2C. Within 30 days of the incident, submit a copy of the analytical results to ADEQ Water Quality Compliance Section, Enforcement Unit.
4. As soon as practicable, remove and properly dispose of excess water in the impoundment until the water level is restored at or below the appropriate freeboard as described in Section 4.1, Table 4.1-3. Record in the facility log, the amount of fluid removed, a description of the removal method, and the disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection/LogBook/Recordkeeping File).
5. Within 30 days of discovery, evaluate the cause of the overtopping and identify the circumstances that resulted in the incident. Implement corrective actions and adjust operational conditions as necessary to resolve the problems identified in the evaluation. Repair any systems as necessary to prevent future occurrences of overtopping.
6. Within 30 days of discovery of overtopping, submit a report to ADEQ as specified in Section 2.7.3.2 (Permit Violation and Alert Level Status Reporting). Include a description of the actions performed in Subsections 1 through 5 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
7. Within 60 days of discovery, and based on sampling in Subsection 3 above, conduct an assessment of the impacts to the subsoil and/or groundwater resulting from the incident.
8. If soil or groundwater is impacted such that it could cause or contribute to an exceedance

of an AQL at the applicable point of compliance, submit to ADEQ for approval, a corrective action plan to address such impacts, including identification of remedial actions and/or monitoring, and a schedule for completion of activities. At the direction of ADEQ, the permittee shall implement the approved plan.

9. Within 30 days of completion of corrective actions, submit to ADEQ, a written report as specified in Section 2.6.6 (Corrective Actions). Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

2.6.3.3 Inflows of Unexpected Materials to a Surface Impoundment

The types of materials that are expected to be placed in the permitted surface impoundments are specified in Section 2.3 (Discharge Limitations). If any unexpected materials flow to a permitted surface impoundment, the permittee shall:

1. As soon as practicable, cease all unexpected inflows to the surface impoundment(s).
2. Within 24-hours of discovery, notify ADEQ Water Quality Compliance Section, Enforcement Unit.
3. Within five (5) days of the incident, identify the source of the material and determine the cause for the inflow. Characterize the unexpected material and contents of the affected impoundment, and evaluate the volume and concentration of the material to determine if it is compatible with the surface impoundment liner. Based on the evaluation of the incident, repair any systems or equipment and/or adjust operations, as necessary to prevent future occurrences of inflows of unexpected materials.
4. Within 30 days of an inflow of unexpected materials, submit a report to ADEQ as specified in Section 2.7.3.2 (Permit Violation and Alert Level Status Reporting). Include a description of the actions performed in Subsections 1 through 3 listed above.
5. Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions including remediation.

2.6.3.4 Unexpected Loss of Fluid in the Injection/Recovery Wells at the PTF

In the event of an unexpected loss of fluid in the injection/recovery wells, such that fluids are released to the surface, vadose zone, or groundwater, the permittee shall:

1. Within two hours of discovery cease injection in the affected area and/or adjust flow rates at injection/recovery wells until an inward hydraulic gradient is reestablished and excess ISCR solutions are recovered necessary to prevent further releases to the environment,
2. Operate the recovery wells in the affected area until the amount of fluid recovered is in excess of the amount of fluid injected during the 24 hour period,
3. Within 24 hours of discovery, notify ADEQ Water Quality Compliance Section.
4. Inspect relevant components such as injection, recovery lines, pumps, flow meters, flow totalizers, pressure gauges, pressure transducers and other associated facilities,
5. Verify proper operations of all facilities within the in-situ leach area,
6. Within 24 hours of discovery, initiate an evaluation to determine the cause for the incident. Identify the circumstances that resulted in the failure and assess the condition of the well. Implement corrective actions as necessary to resolve the problems identified in the evaluation. Initiate repairs to any system, structure, or other component as needed to restore proper functioning of the well. The permittee shall not resume injecting or discharging until repairs of any failed structure are performed and tested as applicable. Repair procedures, methods, and materials used to restore the system(s) to proper operating condition shall be described in the facility log/recordkeeping file and available for ADEQ review. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).

7. Submit a written report within thirty days to ADEQ as specified in Section 2.7.3 (Permit Violation and AL Status Reporting) describing the incident and the corrective actions taken. Upon review of the report, the Department may require an amendment to the permit to require surface, vadose zone or groundwater monitoring, require installation of additional POCs, increased frequency of monitoring, remedial actions, amendments to permit conditions or other actions.
8. Within 30 days of discovery, conduct an assessment of the impacts to the surface, vadose zone and/or groundwater resulting from the incident. If soil or groundwater is impacted, submit to ADEQ, for approval, a corrective action plan to address such impacts, including identification of remedial actions and/or monitoring, and a schedule for completion of activities. The corrective action plan shall be submitted within sixty days of the incident. At the direction of ADEQ, the permittee shall implement the approved plan.

2.6.4 Aquifer Quality Limit Violation

1. If an AQL for a pollutant specified in Section 4.1, Table 4.1-6 and Table 4.1-7, is exceeded in a POC Well, the permittee may conduct verification sampling no later than five (5) days after learning of the violation. If verification sampling does not verify the violation, then the initial violation shall be reported in the Quarterly Monitoring and Compliance Report and no further action shall be required of the permittee for that event.
2. If verification sampling confirms the violation, or if the permittee opts not to perform verification sampling, then the permittee shall:
 - a. Notify ADEQ within five (5) days after confirming or learning of the violation, in accordance with Section 2.7.3;
 - b. Immediately initiate: (1) a BADCT systems evaluation for the cause of the violation, including an inspection of all facilities regulated under this permit and corresponding pollution control devices, and a review of any operational or maintenance practices that might have resulted in an unexpected discharge; and (2) a hydrogeologic assessment of the violation, including groundwater modeling, review of groundwater conditions and upgradient water quality, groundwater contours, and an inventory of downgradient well users and types of uses;
 - c. Increase the frequency of monitoring at the location of the violation to monthly;
 - d. Submit a written report based on the investigation within thirty (30) days after becoming aware of the violation, in accordance with Section 2.7.3; and
 - e. Take actions that may be necessary as a result of the violation under Section 2.6.5.
3. As part of its written report, the permittee may include a technical demonstration that the violation was not caused or contributed to by pollutants discharged from a facility regulated under this APP.
4. Based on the written report, ADEQ may, if necessary: (1) amend the permit to require increased frequency of monitoring or additional monitoring; and (2) authorize corrective action including measures to control the source of a discharge causing the violation (including BADCT correction if necessary); remediate affected soils, surface water or groundwater; and mitigate the impact of the violation on existing uses of the aquifer. ADEQ's corrective action authorization may be in the form of an approval under Section 2.6.6, an amendment of this permit or approval of a contingency plan.
5. If the violation continues for sixty (60) days, then the permittee shall notify downgradient or downstream users who may be directly affected by the violation.
6. If the violation continues for ninety (90) days, then the permittee shall prepare and submit for ADEQ approval a hydrogeologic investigation work plan within thirty (30) after receiving the laboratory results of the third sampling event. The work plan shall assess whether the violation is due to natural or anthropogenic causes and, if exceeded values are found to be related to APP-regulated facilities within the mine site or results are inconclusive, the nature and extent of the

discharge. This hydrogeologic investigation shall become the basis of adjusting permit conditions and/or designing corrective action.

2.6.5 Emergency Response and Contingency Requirements for Unauthorized Discharges pursuant to A.R.S. §49-201(12) and pursuant to A.R.S. § 49-241

2.6.5.1 Duty to Respond

The permittee shall act immediately to correct any condition resulting from a discharge pursuant to A.R.S. § 49-201(12) if that condition could pose an imminent and substantial endangerment to public health or the environment.

2.6.5.2 Discharge of Hazardous Substances or Toxic Pollutants

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of suspected hazardous substances (A.R.S. § 49-201(19)) or toxic pollutants (A.R.S. § 49-243(I)) on the facility site, the permittee shall promptly isolate the area and attempt to identify the discharged material. The permittee shall record information, including name, nature of exposure and follow-up medical treatment, if necessary, on persons who may have been exposed during the incident. The permittee shall notify the ADEQ Water Quality Compliance Section within 24 hours upon discovering the discharge of hazardous material which (a) has the potential to cause an AWQS or AQL to be exceeded, or (b) could pose an endangerment to public health or the environment.

2.6.5.3 Discharge of Non-hazardous Materials

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of non-hazardous materials from the facility, the permittee shall promptly attempt to cease the discharge and isolate the discharged material. Discharged material shall be removed and the site cleaned up as soon as possible. The permittee shall notify the ADEQ Water Quality Compliance Section within 24 hours upon discovering the discharge of non-hazardous material which (a) has the potential to cause an AQL to be exceeded, or (b) could pose an endangerment to public health or the environment.

2.6.5.4 Reporting Requirements

The permittee shall submit a written report for any unauthorized discharges reported under Sections 2.6.5.2 and 2.6.5.3 to ADEQ Water Quality Compliance Section within 30 days of the discharge or as required by subsequent ADEQ action. The report shall summarize the event, including any human exposure, and facility response activities and include all information specified in Section 2.7.3. If a notice is issued by ADEQ subsequent to the discharge notification, any additional information requested in the notice shall also be submitted within the time frame specified in that notice. Upon review of the submitted report, ADEQ may require additional monitoring or corrective actions.

2.6.6 Corrective Actions

Specific contingency measures identified in Section 2.6 and actions identified in the approved contingency plan to be submitted under the Compliance Schedule Section 3.0 have already been approved by ADEQ and do not require written approval to implement.

With the exception of emergency response actions taken under Section 2.6.5, the permittee shall obtain written approval from the Water Permits Section prior to implementing a corrective action to accomplish any of the following goals in response to exceeding an AL or violation of an AQL, DL, or other permit condition:

1. Control of the source of an unauthorized discharge;
2. Soil cleanup;
3. Cleanup of affected surface waters;

4. Cleanup of affected parts of the aquifer; and/or
5. Mitigation to limit the impact of pollutants on existing uses of the aquifer.

Within 30 days of completion of any corrective action, the permittee shall submit to the ADEQ Water Quality Compliance Section, a written report describing the causes, impacts, and actions taken to resolve the problem.

2.7 Reporting and Recordkeeping Requirements

[A.R.S. § 49-243(K)(2) and A.A.C. R18-9-A206(B) and R18-9-A207]

2.7.1 Self-Monitoring Report Form (SMRFs)

1. When submitting a hard copy, the permittee shall complete the Self-monitoring Report Form (SMRF) provided by ADEQ including contact information for the person completing the form. Submit the completed form to the Water Quality Compliance Data and Enforcement Unit.
2. The permittee shall complete the SMRF to the extent that the information reported may be entered on the form. If no information is required during a reporting period, the permittee shall enter "not required" on the SMRF and submit the report to the Water Quality Compliance Data and Enforcement Unit. The permittee shall use the format devised by ADEQ.
3. The tables contained in Section 4.1-6 list the monitoring parameters and frequencies for reporting results on the SMRFs.
4. In addition to the SMRF, the information contained in A.A.C. R18-9-A206(B)(1) shall be included for exceeding an AL or violation of an AQL, DL, or any other permit condition being reported in the current reporting period.

2.7.2 Operation Inspection / Log Book Recordkeeping

A signed copy of this permit shall be maintained at all times at the location where day-to-day decisions regarding the operation of the facility are made. A log book (paper copies, forms or electronic data) of the inspections and measurements required by this permit shall be maintained at the location where day-to-day decisions are made regarding the operation of the facility. The log book shall be retained for ten years from the date of each inspection, and upon request, the permit and the log book shall be made immediately available for review by ADEQ personnel. The information in the log book shall include, but not be limited to, the following information as applicable:

1. Name of inspector;
2. Date and shift inspection was conducted;
3. Condition of applicable facility components;
4. Any damage or malfunction, and the date and time any repairs were performed;
5. Documentation of sampling date and time;
6. Any other information required by this permit to be entered in the log book; and
7. Monitoring records for each measurement shall comply with R18-9-A206(B)(2).

2.7.3 Permit Violation and Alert Level Status Reporting

1. The permittee shall notify the Water Quality Compliance Section in writing within 5 days (except as provided in Section 2.6.5) of becoming aware of a violation of any permit condition, discharge limitation or of an AL exceedance.
2. The permittee shall submit a written report to the Water Quality Compliance Section within 30 days of becoming aware of the violation of any permit condition or discharge limitation. The report shall document all of the following:
 - a. Identification and description of the permit condition for which there has been a violation and a description of its cause;
 - b. The period of violation including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue;

- c. Any corrective action taken or planned to mitigate the effects of the violation, or to eliminate or prevent a recurrence of the violation;
- d. Any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an AWQS;
- e. Changes to the monitoring which include changes in constituents or increased frequency of monitoring; and
- f. Description of any malfunction or failure of pollution control devices or other equipment or processes.

2.7.4 Operational, Other or Miscellaneous Reporting

2.7.4.1 Annual Report

If an Alert Level #1 for Normal Liner Leakage has been exceeded as discussed in Section 2.6.2.2, the permittee shall submit an annual report that summarizes the results of the liner assessment. The Liner Leakage Assessment Report shall also include information including but not limited to the following: number and location of holes identified; a table summarizing the ALI exceedances including the frequency and quantity of fluid removed, and corrective actions taken. The annual report shall be submitted prior to 30 days of expiration of this permit.

2.7.4.2 Ambient Mine Block Concentration Report

Ambient mine block groundwater concentrations are required to be determined in order to establish mine block closure rinsing requirements identified Section 2.9.1. One sample shall be taken from each mine block well in order to establish ambient groundwater concentrations. The permittee shall submit the ambient mine block groundwater concentrations in accordance with the Compliance Schedule in Section 3.0.

2.7.4.3 Required Pre-Operational Report

The permittee shall submit the results obtained from the aquifer pump tests using the outermost recovery wells located at the four corners of the PTF well field in and around the PTF and with a minimum of at least three other wells to be monitored in accordance with the Compliance Schedule (Section 3.0). The Aquifer Pump Test Report shall discuss and evaluate the feasibility of the proposed Pilot Test using data obtained from pump tests at the PTF wells. The evaluation shall verify previously calculated aquifer properties such as hydraulic conductivity, transmissivity, groundwater velocity, etc. and the validity of the porous medium assumption used in the groundwater modeling for the oxide unit. The aquifer pump test report shall also include, at a minimum: all of the data generated during the aquifer tests, description of the aquifer tests, which analytical methods were used to analyze the aquifer test data, description of why those methods were chosen, input and output reports from the chosen aquifer test software.

The report shall include initial Underground Workings ambient discharge characterization as required in Section 2.5.1.

The report shall also include the evaluation of inward gradient during start-up of the nine recovery wells and injection of Oxide Unit water from the four injection wells. The report shall include, at a minimum: potentiometric groundwater contour maps and evaluation of the potentiometric contour maps for cone of depression as required in Section 2.2.3(f) and the Compliance Schedule in Section 3.0.

The report shall include a description of the well abandonment required in Section 2.2.3. The report shall include the information required in Section 2.7.4.5 and the Compliance Schedule in Section 3.0.

The report shall also include well installation details for all Injection, Recovery, Multi-port, Observation, Supplemental, MW-01 and POC wells in accordance with A.A.C. R12-15-801 et seq. and consist of the following:

- Copies of ADWR Notice of Intent (NOI) and all related submittals to ADWR;
- Boring log and well as-built diagram;
- Total depth of well measured after installation;
- Top of well casing or sounding tube (whichever is used as the fixed reference measuring point) and ground surface elevation;
- Depth to static groundwater;
- Geophysical logging reports and subsurface sampling results, if any;
- Description of well drilling method;
- Description of well development method;
- If dedicated sampling equipment installed, details on the equipment and at what depth the equipment was installed;
- Summary of analytical results for initial groundwater sample collected after installation;
- Corresponding analytical data sheets; and
- Global Positioning System (GPS) coordinates for each new well;
- Any deviations from original proposed construction or location.

2.7.4.4 PTF Operations and Monitoring Quarterly Reports

The permittee shall submit quarterly reports concerning the operations and monitoring of the PTF during the 14-month mining and 9-month rinsing phase to the ADEQ Water Permits Section. Quarterly reports shall be submitted no later than 30 days following the end of each calendar quarter. The quarterly report shall demonstrate whether the hydraulic control was maintained at the PTF during the quarterly monitoring period. Hydraulic control shall be demonstrated by, including but not limited to, the following: maintaining a cone of depression that extends to the PMA boundary associated with the PTF well field by pumping more solution out than went in, maintaining a 1-foot difference between pairs of injection and observation wells within the PTF well field, maintaining the fracture gradient, and compliance with ALs and AQLs at the POCs. The report shall include:

1. A graphical representation of the volumes extracted and injected used to maintain hydraulic control. In the event that more solution was injected than recovered for a 24-hour period, or in the event that any of the instruments used to measure the flow volumes malfunction or are out of service for more than 24 consecutive hours, the permittee shall submit a report showing for each day of the quarterly reporting period, the hydraulic gradient was maintained.
2. A graphical representation that a continuous inward hydraulic gradient was maintained using water level elevations in the PTF. The reports shall include a graphical presentation of head comparisons for each pair of observation and recovery wells used to monitor the hydraulic gradient. The report shall also include a figure showing the location and identity of each of the paired wells. In the event any one of the well pairs indicate less than 1-foot differential between observation and recovery wells, or in the event that any of the instruments used to measure the hydraulic gradient malfunction or are out of service for more than 24 consecutive hours, the permittee shall submit a report showing for each day of the quarterly reporting period, the daily flow into and out of the mine block. Inward hydraulic gradient shall also be demonstrated through the submittal of potentiometric groundwater contour maps which depict the monthly minimum, monthly average and monthly maximum inward hydraulic gradient toward the recovery wells using groundwater elevations collected at the PTF well field.
3. Provide the three monthly potentiometric surface maps and provide a description of the cone of depression for the quarter.

4. Provide a report to include the LBFU bulk electrical conductivity contour maps and a description of their interpretation. The report shall be sealed by an appropriate Arizona Registrant.
5. A summary of pressure transducers readings and fracture gradients readings.
6. A graphical representation of electric conductivity readings from the injection and observation wells.
7. A description of any deviations from standard sampling protocols during the reporting period.
8. A summary of all exceedances of ALs, AQLs, Action Levels, DLs, or operational limits that occurred during the reporting period and provide the contingency actions completed to mitigate the effects of the violation, or to eliminate the recurrence of the exceedance or violation. The report shall also include identification and discussion of any laboratory results that fell outside of the laboratory QA/QC criteria and AQLs and ALs required by this permit.
9. Graphical time versus concentration plots of groundwater elevations, field pH, sulfate, and total dissolved solids since the inception of monitoring at each POC well, and any parameter which exceeded an applicable AL or AQL in the past three sampling events at each POC well.
10. Groundwater elevation contour maps for each quarterly monitoring period, including the groundwater elevation obtained from the underground workings. The contour maps shall identify, if known, any wells that were pumping within a half-mile radius of the PTF.
11. Results of the discharge characterization of the underground working, if the required sampling event falls within the quarterly reporting period.
12. Fissure inspection summary for the reporting period.
13. An updated table of all monitor wells in the Discharge Impact Area including, but not limited to, location of well, depth of well, depth to water, and water level elevation.
14. A summary of any groundwater monitor wells replaced in the reporting period including, but not limited to, location of well, depth of well, depth to water, water level elevation, and screened interval.
15. Groundwater sampling results for the POCs, and BADCT Monitor Wells.
16. Copies of Reports submitted to the EPA as required by the UIC permit, including groundwater monitoring results from wells not covered by this permit.

2.7.4.5 Well Abandonment Reports

If wells associated with this permit are abandoned due to poor performance, casing collapse, or other reasons, or are abandoned at the end of the post-closure period, then within 90 days of completing abandonment, the permittee shall submit a well abandonment report to ADEQ Water Permits Section. Appropriate contents of the report shall be sealed by an Arizona professional geologist or professional engineer, in accordance with Arizona Board of Technical Registration requirements. Well abandonment records shall be provided to ADEQ within 90 days of monitor well abandonment and shall include:

1. Copies of ADWR Notice of Intent to Abandon
2. Copies of ADWR Abandonment Reports
3. A description of the methods used to seal the well casing and the perforated or screened interval of the well; and
4. Global Positioning System (GPS) coordinates of the former well location

2.7.4.6 Ambient Groundwater Quality Report

The permittee shall submit an ambient groundwater quality report of the data and calculations required in Section 2.5.3.2, and 2.5.8.5 and Section 3.0 Compliance Schedule Item #13.

The report shall include copies of all laboratory analytical reports, field notes, the QA/QC limits used in collection and analysis of the samples and the statistical calculations of ALs and AQLs for the POC wells, and ALs for the BADCT wells under the ambient water quality monitoring requirements listed in Section 2.5.

2.7.4.7 LBFU Bulk Ambient Electrical Conductivity Report

The permittee shall submit an LBFU Bulk Ambient Electrical Conductivity report per Section 2.5.9.1 and Section 3.0 Compliance Schedule Item #13.

2.7.5 Reporting Location

All SMRFs shall be submitted to:
 Arizona Department of Environmental Quality
 Water Quality Compliance Data and Enforcement Unit
 Mail Code: 5415B-1
 1110 W. Washington Street
 Phoenix, AZ 85007
 Phone (602) 771-4681

All documents required by this permit to be submitted to the Water Quality Compliance Section shall be directed to:

Arizona Department of Environmental Quality
 Water Quality Compliance Section
 Mail Code: 5415B-1
 1110 W. Washington Street
 Phoenix, AZ 85007
 Phone (602) 771-4497

All documents required by this permit to be submitted to the Water Permits Section shall be directed to:

Arizona Department of Environmental Quality
 Water Permits Section
 Mail Code: 5415B-3
 1110 W. Washington Street
 Phoenix, AZ 85007
 Phone (602) 771-4428

2.7.6 Reporting Deadline

The Quarterly Report required by Section 2.7.4 and the results of monitoring conducted during each quarter is due within 15 days of the end of the 1st quarter and every quarter thereafter. The effective date of the permit shall be used for the purpose of determining the beginning of the 1st quarter to begin monitoring and reporting.

The following table lists the report due dates¹

Monitoring conducted during:	Quarterly Report due by:
First Quarter: January-March	April 30
Second Quarter/Semi-Annual: April-June	July 30
Third Quarter: July-September	October 30
Fourth Quarter/Annual: October-December	January 30

¹A post-mark date no later than the due date is considered meeting the due date requirements under this Section.

2.7.7 Changes to Facility Information in Section 1.0

The Water Permits Section and Water Quality Compliance Section shall be notified within 10 days of any change of facility information including Facility Name, Permittee Name, Mailing or Street Address, Facility Contact Person or Emergency Telephone Number.

2.8 Temporary Cessation [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A209(A)]

The permittee shall give written notice to the Water Quality Compliance Section Office before ceasing operation of the facility for a period of 60 days or greater. The permittee shall take the following measures upon temporary cessation:

Immediately following ADEQ's approval, the permittee shall implement the approved plan. If the permittee intends to permanently cease operation of any facility, the permittee shall submit closure notification, as set forth in Section 2.9 below.

At the time of notification the permittee shall submit for ADEQ approval a plan for maintenance of discharge control systems and for monitoring during the period of temporary cessation. Immediately following ADEQ's approval, the permittee shall implement the approved plan. If necessary, ADEQ shall amend permit conditions to incorporate conditions to address temporary cessation. During the period of temporary cessation, the permittee shall provide written notice to the Water Quality Compliance Section Office of the operational status of the facility every ninety days. If the permittee intends to permanently cease operation of any facility, the permittee shall submit closure notification, as set forth in Section 2.9 below.

2.9 Closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(B)]

For a facility addressed under this permit, the permittee shall give written notice of closure to the Water Quality Compliance Section of the permittee's intent to cease operation without resuming activity for which the facility was designed or operated, or submit an amendment application to incorporate the discharging facilities under this permit into the current individual permit (Inventory Number P-101704, LTF Number 53498, dated August 12, 2011).

2.9.1 Closure Plan

Within 90 days of the effective date of this permit, the permittee shall submit for approval to the Water Permits Section, a Closure Plan which meets the requirements of A.R.S. § 49-252 and A.A.C. R18-9-A209(B)(3) and includes the following topics:

1. Updated closure and post-closure financial requirements.
2. Contingency mine block rinsing and sampling, as needed.
3. Confirmation PTF mine block sampling requirements after the completion of the pilot test.
4. Confirmation underground workings sampling requirements after the completion of the pilot test.
5. Outline of Report contents for PTF Summary Report that incorporates updated groundwater modeling at the cessation of the pilot test.
6. An initial 5 year post-closure groundwater monitoring period, with an evaluation to complete additional post-closure monitoring.
7. 5 Year Post-Closure Groundwater Monitoring Report that incorporates updated groundwater modeling.

2.9.2 PTF Mine Block Closure

The permittee will commence PTF closure after the pilot test mining phase has ceased. During mine block closure operations, the permittee will cease the injection of raffinate, and will initiate a mine block rinsing program consisting of the injection of formation water and neutralization agents. At all times during initial block rinsing, the permittee will maintain hydraulic control by sustaining an inward

hydraulic gradient within the mine block. The permittee will monitor the rinsing progress by analyzing the water recovered from well-field headers for sulfate concentration. When levels of sulfate in the headers have reached approximately 750 parts per million (ppm), the permittee will sample the injection well header discharges for constituents listed in Section 4.1 Table 4.1-7. If the results of the sampling show concentrations of parameters greater than the AWQS and or greater than the predetermined mine block concentrations, then rinsing operations will continue until all compounds are below primary MCLs or AWQS or predetermined AWQS mine block concentrations.

The permittee will sample all of the wells in the mine block undergoing closure to determine if the sulfate concentrations are less than 750 ppm and the pH is above 5.0 S.U. The permittee will continue rinsing each well until such time that the sulfate concentration in the well is less than 750 ppm and the pH is above 5 S.U.

When all individual well sulfate concentrations in the mine block are less than 750 ppm and a pH is above 5.0 S.U., hydraulic control will be discontinued for 30 days. At the end of the 30-day period, the headers will be re-sampled and if sulfate concentrations remain below 750 ppm and pH remains above 5.0 S.U., the permittee may cease all rinsing activities within the PTF. All POC wells will continue to be monitored in accordance with Section 2.5.3.3 and 2.5.3.4.

A confirmation groundwater sample of the PTF mine block wells will be required at a one month period, six month period and at the one year increment after the groundwater rinsing has ceased to measure any rebound effects to mine block contaminant concentrations for constituents listed in Section 4.1, Table 4.1-7. The results of the confirmation mine block sampling shall be submitted to ADEQ WPS within 30 days of receiving the laboratory analytical results. The permittee shall amend APP P-101704 to incorporate the required mine block closure confirmation sampling which extends beyond the permitted time frames allowed by the Temporary APP pilot project.

The PTF mine block wells shall be abandoned in accordance with ADWR and UIC regulations. EPA and ADEQ written approval shall be obtained prior to abandoning PTF mine block wells.

2.10 Post-closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(C)]

Post-closure requirements shall be established based on the approval of Closure Plan submitted to ADEQ per Section 2.9.1.

3.0 COMPLIANCE SCHEDULE [A.R.S. § 49-243(K)(5) and A.A.C. R18-9-A208]

For each compliance schedule item listed below, the permittee shall submit the required information, including a cover letter that lists the compliance schedule items, to the Water Permits Section. A copy of the cover letter must also be submitted to the Water Quality Compliance Section.

Submittals/Activities Not Requiring Permit Amendments

	Description	Comments	Due Date
1	Permittee shall submit a copy of signed, dated and scaled as-built drawings along with QA/QC documentation to confirm that all discharging facilities were constructed in accordance with the design report, engineering plans and specifications, and other associated data and information approved by ADEQ.		Within 60 days of completion of construction of the PTF
2	Permittee shall submit a copy of the Pre-Operational Report as required in Section 2.7.4.3 for ADEQ approval.		At least 30 days prior to beginning operation of the PTF
3	Permittee shall submit ambient mine block groundwater concentrations for the PTF wells in accordance with Section 2.7.4.2.		Within 30 days of completion of ambient mine block sampling
4	Permittee shall submit an updated contingency and emergency response plan that complies with the requirements of Arizona Administrative Code R18-9-A204.		Within 30 days of the effective date of the permit (See Section 1.0)
5	Permittee shall conduct initial discharge characterization for parameters listed in Section 4.1, Table 4.1-2C for the PLS Tank, Raffinate Tank, Process Water Impoundment, and Run-off Pond as required by Section 2.5.1.		Within 120 days of start-up of the PTF
6	Permittee shall submit initial discharge characterization results for the PLS Tank, Raffinate Tank, Process Water Impoundment, and Run-off Pond as required by Section 2.5.1 and shall be submitted to the WPS.		Within 30 days of receipt of the laboratory analytical results
7	Permittee shall submit renewal application for this permit.	If the permittee determines additional time in excess of one year after this permit's effective date is needed to conduct the Pilot Study.	Within 60 days prior to the end of the initial year of this permit's effective date

	Description	Comments	Due Date
8	Permittee shall submit a closure plan for all discharging facilities permitted under this Temporary Individual Permit in accordance with Section 2.9.1.		Within 90 days of the effective date of the permit (See Section 1.0)
9	Permittee shall install POC wells and Supplemental Wells in accordance with all Arizona Department of Water Resources (ADWR) requirements		Prior to the aquifer pump tests required by Section 2.2.3
10	Permittee shall submit a proposal for the location of monitor well MW-01 in accordance with Section 2.5.8.1.		Within 14 days of completion of aquifer pump test analysis.
11	Permittee shall install Monitor Well MW-01		Within 30 days of ADEQ approval of the location of MW-01
12	Permittee shall initiate Ambient Water Quality Monitoring for POC wells M54-LBF, M54-O and M52-UBF, Supplemental and Operational Monitoring Well MW-01. The samples shall be analyzed for all of the parameters listed in Table 4.1-5		Within 14 days of completing well development for Supplemental wells and MW-01

Submittals/Activities Requiring Permit Amendment Applications

	Description	Comments	Due Date
13	Permittee shall submit an Ambient Monitoring Report to include: Calculated alert levels for arsenic (see Section 2.5.7); ALs and AQLs for POC wells, ALs for Supplemental Wells and MW-01 as required in Section 2.7.4.6, and; LBFU ambient Bulk Electrical Conductivity report as required in Section 2.5.9.1 and Section 2.7.4.7.		No later than 90 days prior to PTF operation
14	Permittee shall submit an amendment application to incorporate all discharging facilities, and all closure/post-closure activities in accordance with an ADEQ approved Closure Plan per Section 2.9.1 and 2.9.2 from APP P-106360 into APP P-101704. The application shall also include updated closure/post-closure cost estimates for APP P-101704 and a corresponding updated financial assurance mechanism for APP P-101704.		Within 180 days of the effective date of this permit (See Section 1.0)

4.0 TABLES OF MONITORING REQUIREMENTS

4.1 OPERATIONAL MONITORING (or CONSTRUCTION REQUIREMENTS)

Table 4.1-1 Permitted Facilities and BADCT

Table 4.1-2A One-time Sampling Event-Discharge Monitoring Locations

Table 4.1-2B Multiple Sampling Event-Discharge Monitoring Location

Table 4.1-2C Discharge Monitoring Sampling Parameters

Table 4.1-3 Required Inspections and Operational Monitoring

Table 4.1-4 Leak Collection and Removal System Monitoring

Table 4.1-5 Parameters for Ambient Groundwater Monitoring

Table 4.1-6 Quarterly Compliance Groundwater Monitoring

Table 4.1-6B Quarterly Operational Groundwater Monitoring

Table 4.1-7 Semi-Annual Compliance Groundwater Monitoring

Table 4.1-7B Semi-Annual Operational Groundwater Monitoring

Table 4.1-8 In-situ BADCT Monitoring

Table 4.1-1
Permitted Facilities and BADCT

Facility Name	Latitude/Longitude	Facility BADCT
In-Situ Area Injection and Recovery Well Block	33° 3' 1.39" N/111° 26' 4.69" W	Design, construction, testing (mechanical integrity), and operation of injection and recovery wells shall follow EPA Class III rules (40 CFR Part 146). The maximum injection <i>rate</i> shall be no greater than 60 gallons per minute (gpm) per injection well as a monthly average. The maximum <i>fracture pressure</i> shall be no greater than 0.65 pounds per square inch per foot (psi/ft) of depth. Hydraulic control shall be maintained at all times, within the PTF well block, by pumping recovery wells at a rate greater than the injection rate in order to maintain a cone of depression that extends at least 500 feet from the in-situ area injection and recovery well block. The injection and extraction volumes shall be metered at the well-heads, monitored daily, and recorded. All boreholes or wells, other than those approved for the PTF, located within 500-feet of the PTF well field boundary shall be plugged and abandoned per the Arizona Department of Water Resources (ADWR) rules and EPA Underground Injection Control (UIC) regulations prior to PTF operation. During closure of the PTF all operational wells shall be plugged and abandoned per the above regulations.
Process Water Impoundment (PWI)	33° 3' 8.67" N/111° 25' 22.18" W	The PWI will have a capacity of approximately 1.7 million cubic feet, approximately 15 to 23-feet deep, with internal and external side slopes of 2.5-feet horizontal to 1.0-feet vertical (2.5H:1V), and maintain a minimum of two (2) feet freeboard. The PWI will be designed as a double liner system and includes a leak collection and removal system (LCRS). The liner system consists of, from bottom to top; a compacted sub-grade (foundation) with liner bedding, 60-mil HDPE secondary liner, geonet, and 60-mil primary liner. The LCRS will be equipped with a sump located at the lowest elevation of the pond; a sump pump to remove accumulated liquids; and an alarm system for fluid detection.
Run-off Pond	33° 3' 4.66" N/111° 25' 22.6" W	The Runoff Pond will have a capacity of approximately 6,583 cubic feet; the pond depth will be approximately 5-feet deep but will vary; internal and external side slopes will be no less than 2.0-feet horizontal to 1.0-feet vertical (2.5H:1V); and pond shall maintain two (2) feet of freeboard. The Runoff Pond will be designed with a single liner that includes an engineered compacted sub-grade and 60-mil HDPE geomembrane liner. The Runoff Pond will incorporate a sump with pump along with fluid-level detection equipment. When fluid is detected above the level set-point the pump will transfer fluid out of the Runoff Pond to the Water Impoundment per

	pipeline.
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TABLE 4.1-2A One-time Sampling Event-Discharge Monitoring Locations			
Sampling Point Number	Facility	Latitude	Longitude
001	PLS Tank	33° 03' 4.26"	111° 25' 19.50"
002	Raffinate Tank	33° 03' 4.05"	111° 25' 19.68"
003	Process Water Impoundment	33° 03' 8.67"	111° 25' 22.18"
004	Runoff Pond	33° 03' 4.66"	111° 25' 22.6"

TABLE 4.1-2B Multiple Sampling Event-Discharge Monitoring Location			
Sampling Point Number	Facility	Latitude	Longitude
005	Underground workings – Main Shaft	33° 03' 4.13"	111° 25' 45.07"

Table 4.1-2C Discharge Monitoring Sampling Parameters (in mg/L unless otherwise noted)		
pH – field & lab (SU)	Sodium	Nickel
Specific Conductance - field and lab (µmhos/cm)	Iron	Selenium
Total Dissolved Solids	Aluminum	Thallium
Total Alkalinity	Antimony	Zinc
Carbonate	Arsenic	Gross Alpha Particle Activity (pCi/L) ¹
Bicarbonate	Barium	Radium 226 + Radium 228 (pCi/L)
Nitrate	Beryllium	Uranium-Isotopes (pCi/L) ²
Sulfate	Cadmium	Total Petroleum Hydrocarbons
Chloride	Chromium	Benzene
Fluoride	Cobalt	Toluene
Calcium	Copper	Ethylbenzene
Ammonia	Lead	Total Xylenes
Magnesium	Manganese	Uranium, Total (µg/L)
Potassium	Mercury	

1. The adjusted gross alpha particle activity is the gross alpha particle activity, including radium 226, and any other alpha emitters, if present in the water sample, minus radon and total uranium (the sum of uranium 238, uranium 235 and uranium 234 isotopes). The gross alpha analytical procedure (evaporation technique: EPA Method 900.0) drives off radon gas in the water samples. Therefore, the Adjusted Gross Alpha should be calculated using the following formula: (Laboratory Reported Gross Alpha MINUS Sum of the Uranium Isotopes).
2. Uranium Isotope activity results must be used for calculating Adjusted Gross Alpha. No SMRF reporting is required.

NOTE: Metals shall be analyzed as dissolved metals.

Table 4.1-3 Required Inspections and Operational Monitoring			
Facility Category	Facility Name	Operational Requirements	Inspection Frequency
Process Solution Impoundment	Process Water Impoundment	<ul style="list-style-type: none"> -Maintain 2 feet of freeboard; -all discharge and sump pumps operational; -no substantial erosion, subsidence, cracking, -no evidence of seepage or other damage to berms; -no visible cracks or damage to liner; -full access to leak detection system maintained. 	Daily
Lined Non-stormwater Containment Pond	Run-off Pond	<ul style="list-style-type: none"> -Maintain 2 feet of freeboard; -Spillway clear of sediment or obstructions; -no visible cracking or damage to liner; -no operational damage to enclosure wall; -all pumps operational; -backup power supply operational; -no ponding of spilled material in pond and sumps; -sediment deeper than 1 inch deep removed from sumps; -fluids in sumps maintained at less than pump-down levels. 	Weekly
Storm water control structures	Site-wide - stormwater ditches	<ul style="list-style-type: none"> -No substantial erosion or structural damage; -maintained free of sediments, vegetation or obstructions. 	Monthly
Groundwater Monitoring Wells	Site-wide - monitoring wells	Wellhead cap or box locks are observed to be secure.	Quarterly, as sampled
Pumps	Site-wide - Barge Pumps, Run-Off Transfer Pumps, Sump Pumps, Discharge Pumps	<ul style="list-style-type: none"> Check hour meters; -visual inspection for leaks. -Lubrication -Maintenance and test run. 	Weekly Per manufacturers specification Every 1,000 to 1,200 hours of operation
In-Situ Area Injection and Recovery Well Block	Well Field	No leakage from pipelines, manifolds or well heads.	Daily
In-Situ Area Injection and Recovery Well Block	Well Field	Initiate subsidence/fissure monitoring program.	Quarterly

Table 4.1-4						
Leak Collection and Removal System Monitoring						
Facility Name	Alert Level #1 (GPD)	Alert Level #2 (GPD)	Monitoring Method	Monitoring Frequency	Reporting Frequency	
Process Water Impoundment	2,040	16,250	Automated	Daily	Annual	

GPD = gallons per day per wetted acre

Note: The Alert Level 1 (AL1) or Alert Level 2 (AL2) shall be exceeded when the amount of leakage pumped from the sump for the evaporation pond is greater than the applicable quantity below. Contingency requirements of Sections 2.6.2.3 shall be followed for AL1 and AL2 exceedances, respectively. An exceedance of AL 1 or AL2 is not a violation of the permit unless the permittee fails to perform actions as required under the Sections referenced above

Table 4.1-5		
Parameters for Ambient Groundwater Monitoring (in mg/L unless otherwise noted)		
Depth to Water Level (feet)	Potassium	Nickel
Water Level Elevation (feet amsl)	Sodium	Selenium
Temperature- field (°F)	Iron	Thallium
pH – field & lab (SU)	Aluminum	Zinc
Specific Conductance- field & lab (µmhos/cm)	Antimony	Free Cyanide
Total Dissolved Solids	Arsenic	Adjusted Gross Alpha (pCi/L) ¹
Total Alkalinity	Barium	Radium 226 (pCi/L)
Bicarbonate	Beryllium	Radium 228 (pCi/L)
Carbonate	Cadmium	Uranium-Isotopes(pCi/L) ²
Hydroxide	Chromium	Carbon Disulfide
Sulfate	Cobalt	Benzene
Chloride	Copper	Toluene
Fluoride	Lead	Ethylbenzene
Nitrate + Nitrite	Manganese	Total Xylenes
Calcium	Mercury	Uranium, Total (µg/L)
Magnesium	Molybdenum	

1. The adjusted gross alpha particle activity is the gross alpha particle activity, including radium 226, and any other alpha emitters, if present in the water sample, minus radon and total uranium (the sum of uranium 238, uranium 235 and uranium 234 isotopes). The gross alpha analytical procedure (evaporation technique: EPA Method 900.0) drives off radon gas in the water samples. Therefore, the Adjusted Gross Alpha should be calculated using the following formula: (Laboratory Reported Gross Alpha MINUS Sum of the Uranium Isotopes).
2. Uranium Isotope activity results must be used for calculating Adjusted Gross Alpha. No SMRF reporting is required.

NOTE: Metals must be analyzed as dissolved metals.

TABLE 4.1-6
Quarterly Compliance Groundwater Monitoring (in mg/L unless otherwise noted)

Parameter	POC Well # M14-GL		POC Well # M15-GU		POC Well # M22-O		POC Well # M23-UBF	
	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)
Depth to Groundwater (ft bgs)	Monitor ¹	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft amsl)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
pH- field (S.U.)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Specific Conductance- field (µmhos/cm)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Temperature- field (°F)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Fluoride	4.0	3.2	4.0	3.2	4.0	3.2	4.0	3.2
Magnesium	Monitor	23	Monitor	44	Monitor	8.6	Monitor	69
Sulfate	Monitor	144	Monitor	126	Monitor	86	Monitor	411
Total dissolved solids	Monitor	874	Monitor	1,359	Monitor	1,094	Monitor	2,392

Parameter	POC Well #M54-LBF		POC Well # M54-O		POC Well # M52-UBF	
	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)
Depth to Groundwater (ft bgs)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft amsl)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
pH- field (S.U.)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Specific Conductance- field (µmhos/cm)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Temperature- field (°F)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Fluoride	Reserved ²	Reserved	Reserved	Reserved	Reserved	Reserved
Magnesium	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Sulfate	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Total dissolved solids	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved

1. Monitor = Monitoring required, but no AQL or AL will be established in the permit.

2. Reserved = At the conclusion of eight (8) rounds of groundwater sampling; the permittee is required to submit an Ambient Groundwater Report and a permit amendment request to the WPS to propose AQLs and ALs in accordance with the Compliance Schedule (Section 3.0). Alert levels and aquifer quality limits shall be established as required in Sections 2.5.3.2.1 and 2.5.3.2.2.

Table 4.1-6B				
Quarterly Operational Groundwater Monitoring				
Parameter	Supplemental Well M55-UBF	Supplemental Well M56-LBF	Supplemental Well M57-)	Supplemental Well M58-O
	AL (mg/L)	AL (mg/L)	AL (mg/L)	AL (mg/L)
Depth to Groundwater (ft. bgs)	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft amsl)	Monitor	Monitor	Monitor	Monitor
pH (field) (S.U.)	Monitor	Monitor	Monitor	Monitor
Specific Conductance (field) (mhos/cm)	Monitor	Monitor	Monitor	Monitor
Temperature (field)	Monitor	Monitor	Monitor	Monitor
Fluoride	Reserved	Reserved	Reserved	Reserved
Magnesium	Reserved	Reserved	Reserved	Reserved
Sulfate	Reserved	Reserved	Reserved	Reserved
Total Dissolved Solids	Reserved	Reserved	Reserved	Reserved
Parameter	Supplemental Well M59-O	Supplemental Well M60-O	Supplemental Well M61-LBF	Operational Monitor Well MMW-01
	AL (mg/L)	AL (mg/L)	AL (mg/L)	AL (mg/L)
Depth to Groundwater (ft. bgs)	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft amsl)	Monitor	Monitor	Monitor	Monitor
pH (field) (S.U.)	Monitor	Monitor	Monitor	Monitor
Specific Conductance (field) (mhos/cm)	Monitor	Monitor	Monitor	Monitor
Temperature (field)	Monitor	Monitor	Monitor	Monitor
Fluoride	Reserved	Reserved	Reserved	Reserved
Magnesium	Reserved	Reserved	Reserved	Reserved
Sulfate	Reserved	Reserved	Reserved	Reserved

Total Dissolved Solids	Reserved	Reserved	Reserved	Reserved
<i>AL = Alert Level</i> <i>ft amsl = feet above mean sea level</i> <i>ft bgs = feet below ground surface</i> <i>mg/L = milligrams per liter</i> <i>mhos/cm = mhos per centimeter</i> <i>S.U. = Standard Units</i>				

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TABLE 4.1-7
Semi-Annual Compliance Groundwater Monitoring (in mg/L unless otherwise noted)

Parameter ¹	POC Well # M14-GL		POC Well # M15-GU		POC Well # M22-0		POC Well M23-UBF	
	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)
Depth to Groundwater (ft)	Monitor ²	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft amsl)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
pH- field (S.U.)		Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Specific Conductance- field (umhos/cm)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Temperature- field(°F)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
pH (lab)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Bicarbonate	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Calcium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Carbonate	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Chloride	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Fluoride	4.0	3.2	4.0	3.2	4.0	3.2	4.0	3.2
Magnesium	Monitor	23	Monitor	44	Monitor	8.6	Monitor	69
Nitrate as nitrogen	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Potassium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Sodium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Sulfate	Monitor	144	Monitor	126	Monitor	86	Monitor	411
Total dissolved solids	Monitor	874	Monitor	1359	Monitor	1094	Monitor	2392
Cation/anion balance	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aluminum	Monitor	0.71	Monitor	0.71	Monitor	0.71	Monitor	0.71
Antimony	0.006	0.0048	0.006	0.0048	0.0076	Monitor	0.006	0.0048
Arsenic ³	0.05	0.026	0.05	0.026	0.05	0.026	0.05	0.026
Barium	2.0	1.6	2.0	1.6	2.0	1.6	2.0	1.6
Beryllium	0.004	0.0032	0.0043	0.0032	0.004	0.032	0.004	0.0032
Cadmium	0.005	0.004	0.02	Monitor	0.02	Monitor	0.005	0.004
Chromium (total)	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Cobalt	Monitor	0.005	Monitor	0.005	Monitor	0.005	Monitor	0.005
Copper	Monitor	0.51	Monitor	0.51	Monitor	0.51	Monitor	0.51

Iron (total)	Monitor	2.2	Monitor	2.2	Monitor	2.2	Monitor	2.2
Lead	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04

TABLE 4.1-7 Semi-Annual Compliance Groundwater Monitoring (in mg/L unless otherwise noted)

Parameter	POC Well # M14-GL		POC Well # M15-GU		POC Well # M22-O		POC Well # M23-UBF	
	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)
Manganese	Monitor	0.22	Monitor	0.22	Monitor	0.22	Monitor	0.22
Mercury	0.002	0.0016	0.002	0.0016	0.002	0.0016	0.002	0.0016
Nickel	0.1	0.08	0.1	0.08	0.1	0.08	0.10	0.08
Selenium	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Thallium	0.002	0.0016	0.002	0.0016	0.01	Monitor	0.012	Monitor
Zinc	Monitor	2.5	Monitor	2.5	Monitor	2.5	Monitor	2.5
Adjusted Gross Alpha ⁴ (pCi/L)	15	12	15	12	15	12	15	12
Radium 226 + 228 (pCi/L)	5	4	5	4	5	4	5	4
Uranium Isotopes ⁶ (pCi/L)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Uranium, Total (µg/L)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Total petroleum hydrocarbons- diesel	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Benzene	0.005	0.004	0.005	0.004	0.005	0.004	0.005	0.004
Ethylbenzene	0.7	0.56	0.7	0.56	0.7	0.56	0.7	0.56
Toluene	1.0	0.08	1.0	0.08	1.0	0.08	1.0	0.08
Total Xylene	10	8	10	8	10	8	10	8

1. Metals must be analyzed as dissolved metals.
2. Monitor = Monitoring required, but no AQL or AL will be established in the permit.
3. The Alert Level for Arsenic is a narrative standard that is applied in order to protect downgradient users and will be revised, as necessary, in accordance with Section 2.5.7 and Section 3.0 to ensure that the UPL of 0.01 mg/L is not exceeded at the downgradient edge of the State Mineral Lease Land.
4. If the gross alpha particle activity is greater than the AL or AQL, then calculate the adjusted gross alpha particle activity. The adjusted gross alpha particle activity is the gross alpha particle activity, including radium 226, and any other alpha emitters, if present in the water sample, minus radon and total uranium

(the sum of uranium 238, uranium 235 and uranium 234 isotopes). The gross alpha analytical procedure (evaporation technique: EPA Method 900.0) drives off radon gas in the water samples. Therefore, the Adjusted Gross Alpha should be calculated using the following formula: (Laboratory Reported Gross Alpha MINUS Sum of the Uranium Isotopes).

5. Uranium Isotope activity results must be used for calculating Adjusted Gross Alpha.

TABLE 4.1-7 Semi-Annual Compliance Groundwater Monitoring (in mg/L unless otherwise noted)

Parameter ¹	POC Well # M54-LBF		POC Well #M54-0		POC Well # M52-UBF	
	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)
Depth to Groundwater (ft)	Monitor ²	Monitor	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
pH- field) (S.U.)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Specific conductance - field) (umbos/cm)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Temperature -field(°F)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
pH (lab)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Bicarbonate	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Calcium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Carbonate	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Chloride	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Fluoride	Reserved ⁶	Reserved	Reserved	Reserved	Reserved	Reserved
Magnesium	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Nitrate as nitrogen	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Potassium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Sodium	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Sulfate	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Total dissolved solids	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Cation/anion balance	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aluminum	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Antimony	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Arsenic ³	0.05	0.026	0.05	0.026	Reserved	Reserved
Barium	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Beryllium	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Cadmium	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Chromium (total)	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Cobalt	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Copper	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Iron	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Lead	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

TABLE 4.1-7 Semi-Annual Compliance Groundwater Monitoring (in mg/L unless otherwise noted)						
Parameter	POC Well # M54-LBF		POC Well # M54-O		POC Well # M52-UBF	
	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)	AQL (mg/l)	AL (mg/l)
Manganese	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Mercury	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Nickel	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Selenium	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Thallium	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Zinc	Monitor	Reserved	Monitor	Reserved	Monitor	Reserved
Adjusted Gross Alpha ⁴ (pCi/L)	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Radium 226 + 228 (pCi/L)	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Uranium Isotopes ⁵ (pCi/L)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Uranium, Total (µg/L)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Total petroleum hydrocarbons- diesel	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Benzene	0.005	0.004	0.005	0.004	0.005	0.004
Ethylbenzene	0.7	0.56	0.7	0.56	0.7	0.56
Toluene	1.0	0.08	1.0	0.08	1.0	0.08
Total Xylene	10	8	10	8	10	8

1. Metals must be analyzed as dissolved metals.
2. Monitor = Monitoring required, but no AQL or AL will be established in the permit.
3. The Alert Level for Arsenic is a narrative standard that is applied in order to protect downgradient users and will be revised, as necessary, in accordance with Section 2.5.7 and Section 3.0 to ensure that the UPL of 0.01 mg/L is not exceeded at the downgradient edge of the State Mineral Lease Land.
4. If the gross alpha particle activity is greater than the AL or AQL, then calculate the adjusted gross alpha particle activity. The adjusted gross alpha particle activity is the gross alpha particle activity, including radium 226, and any other alpha emitters, if present in the water sample,

minus radon and total uranium (the sum of uranium 238, uranium 235 and uranium 234 isotopes). The gross alpha analytical procedure (evaporation technique: EPA Method 900.0) drives off radon gas in the water samples. Therefore, the Adjusted Gross Alpha should be calculated using the following formula: (Laboratory Reported Gross Alpha MINUS Sum of the Uranium Isotopes).

5. Uranium Isotope activity results must be used for calculating Adjusted Gross Alpha.
6. Reserved = At the conclusion of eight (8) rounds of groundwater sampling; the permittee is required to submit an Ambient Groundwater Report and a permit amendment request to the WPS to propose AQLs and ALs in accordance with the Compliance Schedule (Section 3.0). Alert levels and aquifer quality limits shall be established as required in Sections 2.5.3.2.1 and 2.5.3.2.2

Table 4.1-7B Semi-Annual Operational Groundwater Monitoring				
Parameter	Supplemental Well M55-UBF	Supplemental Well M56-LBF	Supplemental Well M57-O	Supplemental Well M-58-O
	AL (mg/l)	AL (mg/l)	AL (mg/l)	AL (mg/l)
Depth to Groundwater (ft bgs)	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft amsl)	Monitor	Monitor	Monitor	Monitor
pH- field) (S.U.)	Monitor	Monitor	Monitor	Monitor
Specific conductance - field) (umhos/cm)	Monitor	Monitor	Monitor	Monitor
Temperature -field(°F)	Monitor	Monitor	Monitor	Monitor
pH (lab)	Monitor	Monitor	Monitor	Monitor
Bicarbonate	Monitor	Monitor	Monitor	Monitor
Calcium	Monitor	Monitor	Monitor	Monitor
Carbonate	Monitor	Monitor	Monitor	Monitor
Chloride	Monitor	Monitor	Monitor	Monitor
Fluoride	Reserved	Reserved	Reserved	Reserved
Magnesium	Reserved	Reserved	Reserved	Reserved
Nitrate as nitrogen ¹	Monitor	Monitor	Monitor	Monitor
Potassium	Monitor	Monitor	Monitor	Monitor
Sodium	Monitor	Monitor	Monitor	Monitor
Sulfate	Reserved	Reserved	Reserved	Reserved
Total dissolved solids	Reserved	Reserved	Reserved	Reserved

Cation/anion balance	Monitor	Monitor	Monitor	Monitor
Aluminum	Reserved	Reserved	Reserved	Reserved
Antimony	Reserved	Reserved	Reserved	Reserved
Arsenic	Reserved	Reserved	Reserved	Reserved
Barium	Reserved	Reserved	Reserved	Reserved
Beryllium	Reserved	Reserved	Reserved	Reserved
Cadmium	Reserved	Reserved	Reserved	Reserved
Chromium (total)	Reserved	Reserved	Reserved	Reserved
Cobalt	Reserved	Reserved	Reserved	Reserved
Copper	Reserved	Reserved	Reserved	Reserved
Iron	Reserved	Reserved	Reserved	Reserved
Lead	Reserved	Reserved	Reserved	Reserved
Manganese	Reserved	Reserved	Reserved	Reserved
Mercury	Reserved	Reserved	Reserved	Reserved
Table 4.1-7B Semi-Annual Operational Groundwater Monitoring				
Parameter	Supplemental Well M55-UBF	Supplemental Well M56-LBF	Supplemental Well M57-O	Supplemental Well M-58-O
	AL (mg/l)	AL (mg/l)	AL (mg/l)	AL (mg/l)
Nickel	Reserved	Reserved	Reserved	Reserved
Selenium	Reserved	Reserved	Reserved	Reserved
Thallium	Reserved	Reserved	Reserved	Reserved
Zinc	Reserved	Reserved	Reserved	Reserved
Gross Alpha	Reserved	Reserved	Reserved	Reserved
Adjusted Alpha ^{2,3}	Reserved	Reserved	Reserved	Reserved
Radium 226 + 228 ²	Reserved	Reserved	Reserved	Reserved
Uranium Isotopes ²	Monitor	Monitor	Monitor	Monitor
Uranium (total)	Monitor	Monitor	Monitor	Monitor
TPH - diesel	Monitor	Monitor	Monitor	Monitor
Benzene	Reserved	Reserved	Reserved	Reserved
Ethylbenzene	Reserved	Reserved	Reserved	Reserved
Toluene	Reserved	Reserved	Reserved	Reserved
Total Xylene	Reserved	Reserved	Reserved	Reserved

Parameter	Supplemental Well M-59-O	Supplemental Well M-60-O	Supplemental Well	Operational Monitor Well MW-01
	AL (mg/l)	AL (mg/l)	AL (mg/l)	AL (mg/l)
Depth to Groundwater (ft bgs)	Monitor	Monitor	Monitor	Monitor
Water Level Elevation (ft amsl)	Monitor	Monitor	Monitor	Monitor
pH- field) (S.U.)	Monitor	Monitor	Monitor	Monitor
Specific conductance - field) (μ mhos/cm)	Monitor	Monitor	Monitor	Monitor
Temperature -field($^{\circ}$ F)	Monitor	Monitor	Monitor	Monitor
pH (lab)	Monitor	Monitor	Monitor	Monitor
Bicarbonate	Monitor	Monitor	Monitor	Monitor
Calcium	Monitor	Monitor	Monitor	Monitor
Carbonate	Monitor	Monitor	Monitor	Monitor
Chloride	Monitor	Monitor	Monitor	Monitor
Fluoride	Reserved	Reserved	Reserved	Reserved
Magnesium	Reserved	Reserved	Reserved	Reserved
Nitrate as Nitrogen ¹	Monitor	Monitor	Monitor	Monitor
Potassium	Reserved	Reserved	Reserved	Reserved
Sodium	Reserved	Reserved	Reserved	Reserved
Sulfate	Reserved	Reserved	Reserved	Reserved
Total dissolved solids	Reserved	Reserved	Reserved	Reserved
Cation/anion balance	Monitor	Monitor	Monitor	Monitor
Aluminum	Reserved	Reserved	Reserved	Reserved
Antimony	Reserved	Reserved	Reserved	Reserved
Arsenic	Reserved	Reserved	Reserved	Reserved
Barium	Reserved	Reserved	Reserved	Reserved
Beryllium	Reserved	Reserved	Reserved	Reserved
Cadmium	Reserved	Reserved	Reserved	Reserved
Chromium (total)	Reserved	Reserved	Reserved	Reserved
Cobalt	Reserved	Reserved	Reserved	Reserved
Copper	Reserved	Reserved	Reserved	Reserved

Iron	Reserved	Reserved	Reserved	Reserved
Lead	Reserved	Reserved	Reserved	Reserved
Manganese	Reserved	Reserved	Reserved	Reserved
Mercury	Reserved	Reserved	Reserved	Reserved
Nickel	Reserved	Reserved	Reserved	Reserved
Selenium	Reserved	Reserved	Reserved	Reserved
Thallium	Reserved	Reserved	Reserved	Reserved
Zinc	Reserved	Reserved	Reserved	Reserved
Gross Alpha	Reserved	Reserved	Reserved	Reserved
Adjusted Alpha ^{2,3}	Reserved	Reserved	Reserved	Reserved
Radium 226 + 228 ²	Reserved	Reserved	Reserved	Reserved
Uranium Isotopes ²	Monitor	Monitor	Monitor	Monitor
Uranium (total)	Reserved	Reserved	Reserved	Reserved
TPH - diesel	Monitor	Monitor	Monitor	Monitor
Benzene	Reserved	Reserved	Reserved	Reserved
Ethylbenzene	Reserved	Reserved	Reserved	Reserved
Toluene	Reserved	Reserved	Reserved	Reserved
Total Xylene	Reserved	Reserved	Reserved	Reserved

1. Nitrate will be used only for calculation of cation/anion balance because of regional nitrate pollution and none used in processes.

2. These parameters are to be analyzed for only if the concentration of Gross Alpha Particle Activity exceeds the established alert level.

3. Adjusted gross alpha includes radium-226 but excludes radon-222 and total uranium.

AL = Alert Level

ft amsl = feet above mean sea level

ft bgs = feet below ground surface

mg/L = milligrams per liter

mhos/cm = mhos per centimeter

S.U. = Standard Units

TPH = Total petroleum hydrocarbons

**TABLE 4.1-8
In-Situ BADCT Monitoring**

Parameter	Wells Monitored	Monitoring Frequency	Alert Level	Method	Reporting Frequency
Injection Rate of well field	All Injection Wells	Monthly average	When Greater than 240gpm	Flow Meter	Monthly
Recovery Rate of well field	All Recovery Wells	Monthly average	Maximum 300 gpm	Flow Meter	Monthly
Recovered Volume to Injection Volume	Comparison of all Injection Wells and all Recovery Wells	Daily	Recovered Volume is Less than Injected Volume	Flow Meter	Weekly
Inward Hydraulic Gradient	Four Injection Wells and Four Observation Wells	Daily average	Less than 1-foot differential as a daily average*	Transducer	Weekly
Maximum Injection Pressure	All Injection Wells	Daily	When Greater than 0.65 psi/ft.	Pressure Gauge	Weekly
LBFU Bulk Electrical Conductivity	Measured at Sensors Installed on All Observation Wells	Weekly	Reserved	Exclusion Zone/LBFU Conductivity Sensors	Quarterly
Well Bore Electrical Conductivity	Measured at Sensors Installed Above MFGU on ALL Observation Wells, Supplemental Wells, Operational Monitoring Well (MW-01) and Multi-Level Sampling Wells	Quarterly	Current Value Greater than Previous Value	Annular Conductivity Device	Quarterly

Fluid Electrical Conductivity	Comparison of Fluid Sample Collected From All Observation Wells and All Injection Wells	Daily	Observation Well Conductivity Equal to or Greater than Injection Well Conductivity	Fluid Sample	Quarterly
Cone of Depression	Potentiometric Surface Map Compiled using Water Levels Measured at All Observation Wells, Supplemental Monitoring Wells Completed in the Oxide, Operational Monitoring Well MW-01, and POC Wells Completed in the Oxide	Compiled Monthly	Groundwater Elevation at Downgradient Edge of PMA Boundary (as measured at M54-O) is Higher than Groundwater Elevation at the Downgradient PTF Observation Well	Potentiometric Surface Map	Quarterly

*Per monitoring of designated 4-pairs of observation/recovery wells (EPA UIC Class III)

5.0 REFERENCES AND PERTINENT INFORMATION

The terms and conditions set forth in this permit have been developed based upon the information contained in the following, which are on file with the Department:

1. Public File for Curis Resources Inc., Application for Temporary Individual Aquifer Protection Permit, dated March 12, 2012, Public File No P-106360.
2. Minor Amendment Application, dated November 21, 2013.
3. Significant Amendment Application received April 1, 2015; and supplemental information received in support of the amendment application on: September 14, 2015; October 23, 2015; December 14, 2015; and January 25, 2016.

6.0 NOTIFICATION PROVISIONS

6.1 Annual Registration Fees

The permittee is notified of the obligation to pay an Annual Registration Fee to ADEQ. The Annual Registration Fee is based upon the amount of daily influent or discharge of pollutants in gallons per day as established by A.R.S. § 49-242.

6.2 Duty to Comply [A.R.S. §§ 49-221 through 49-263]

The permittee is notified of the obligation to comply with all conditions of this permit and all applicable provisions of Title 49, Chapter 2, Articles 1, 2 and 3 of the Arizona Revised Statutes, Title 18, Chapter 9, Articles 1 through 4, and Title 18, Chapter 11, Article 4 of the Arizona Administrative Code. Any permit non-compliance constitutes a violation and is grounds for an enforcement action pursuant to Title 49, Chapter 2, Article 4 or permit amendment, suspension, or revocation.

6.3 Duty to Provide Information [A.R.S. §§ 49-243(K)(2) and 49-243(K)(8)]

The permittee shall furnish to the Director, or an authorized representative, within a time specified, any information which the Director may request to determine whether cause exists for amending or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

6.4 Compliance with Aquifer Water Quality Standards [A.R.S. §§ 49-243(B)(2) and 49-243(B)(3)]

The permittee shall not cause or contribute to a violation of an aquifer water quality standard at the applicable point of compliance for the facility. Where, at the time of issuance of the permit, an aquifer already exceeds an aquifer water quality standard for a pollutant, the permittee shall not discharge that pollutant so as to further degrade, at the applicable point of compliance for the facility, the water quality of any aquifer for that pollutant.

6.5 Technical and Financial Capability

[A.R.S. §§ 49-243(K)(8) and 49-243(N) and A.A.C. R18-9-A202(B) and R18-9-A203(E) and (F)]

The permittee shall have and maintain the technical and financial capability necessary to fully carry out the terms and conditions of this permit. Any bond, insurance policy, trust fund, or other financial assurance mechanism provided as a demonstration of financial capability in the permit application, pursuant to A.A.C. R18-9-A203(D), shall be in effect prior to any discharge authorized by this permit and shall remain in effect for the duration of the permit.

6.6 Reporting of Bankruptcy or Environmental Enforcement [A.A.C. R18-9-A207(C)]

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. The filing of bankruptcy by the permittee.
2. The entry of any order or judgment not issued by the Director against the permittee for the enforcement of any environmental protection statute or rule.

6.7 Monitoring and Records [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A206]

The permittee shall conduct any monitoring activity necessary to assure compliance with this permit, with the applicable water quality standards established pursuant to A.R.S. §§ 49-221 and 49-223 and §§ 49-241 through 49-252.

6.8 Inspection and Entry [A.R.S. §§ 41-1009, 49-203(B) and 49-243(K)(8)]

In accordance with A.R.S. §§ 41-1009 and 49-203(B), the permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to enter and inspect the facility as reasonably necessary to ensure compliance with Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, and Title 18, Chapter 9, Articles 1 through 4 of the Arizona Administrative Code and the terms and conditions of this permit.

6.9 Duty to Modify [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A211]

The permittee shall apply for and receive a written amendment before deviating from any of the designs or operational practices specified by this permit.

6.10 Permit Action: Amendment, Transfer, Suspension & Revocation

[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

This permit may be amended, transferred, renewed, or revoked for cause, under the rules of the Department.

The permittee shall notify the Water Permits Section in writing within 15 days after any change in the owner or operator of the facility. The notification shall state the permit number, the name of the facility, the date of property transfer, and the name, address, and phone number where the new owner or operator can be reached. The operator shall advise the new owner or operators of the terms of this permit and the need for permit transfer in accordance with the rules.

7.0 ADDITIONAL PERMIT CONDITIONS**7.1 Other Information [A.R.S. § 49-243(K)(8)]**

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit the correct facts or information.

7.2 Severability

[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby. The filing of a request by the permittee for a permit action does not stay or suspend the effectiveness of any existing permit condition.

7.3 Permit Transfer

This permit may not be transferred to any other person except after notice to and approval of the transfer by the Department. No transfer shall be approved until the applicant complies with all transfer requirements as specified in A.A.C. R18-9-A212(B) and (C).

